

AUSTRALIAN CUMACEA No. 11<sup>(1)</sup>  
THE FAMILY DIASTYLIDAE (PART 1)

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Fig. 1-26

INTRODUCTION

The Australian Diastylid fauna, as collected to date, presents a facies very different from that of the Arctic, Subarctic and Boreal regions; the Cumacea of the Antarctic and Subantarctic are as yet not very well known.

While more than 40 Australian species are now in hand, mainly from off the southern and eastern coasts, two-thirds of them belong to *Gynodiastylis* and allied genera, where the reduction of parts is carried further than anywhere else within the family. These last are dealt with in another place. The other species are referred to four genera which may be separated as follows:—

- |   |                                                                                                                                                   |                              |   |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---|
| 1 | Adult male with basis of peraeopods not greatly expanded, and with flagellum of second antenna short. ....                                        | <i>Leptostylis</i> Sars.     |   |
|   | Adult male with basis of first to fourth peraeopods greatly expanded and with flagellum of second antenna reaching at least to end of pleon. .... |                              | 2 |
| 2 | Third maxilliped of female without exopod. ....                                                                                                   | <i>Paradiastylis</i> Calman  |   |
|   | Third maxilliped of female with exopod. ....                                                                                                      |                              | 3 |
| 3 | Pleopods each with two rami, furnished with plumose setae. Female with no trace of exopods on third and fourth peraeopods. ....                   | <i>Dimorphostylis</i> Zimmer |   |
|   | Pleopods each with only one ramus, furnished with modified, non-plumose setae. Female with small exopods on third and fourth peraeopods.          | <i>Anchistylis</i> gen. nov. |   |

The three last-named genera present points of interest when compared to the *Gynodiastylis* group. In *Paradiastylis* the exopod of the third maxilliped of the female is consistently absent, in some species of *Dimorphostylis* it is rather small in this sex. In *Dimorphostylis vieta* the pleopod is somewhat more rudimentary than in other species referred to the genus. The post-anal part of the telson is short or insignificant in both sexes of *Paradiastylis* and *Dimorphostylis australis* Foxon, and also in the females of *Dimorphostylis asiatica* Zimmer, *D. vieta* (Hale), *D. colefaxi* sp. nov. and *Anchistylis*. The three genera are outstanding in that they have the basis of all but the last of the peraeopods of the adult male conspicuously expanded, distally produced, and furnished with exopods having the peduncle very broad; these wide thoracic exopods are strikingly different from those of *Gynodiastylis*, etc., where the specialized second antenna of the male and the complete absence of pleopods provide good distinguishing features. Also worthy of attention is the telson of *Dimorphostylis australis*, where, while there is no distinct post-anal part, the somite is very long and cylindrical, a feature paralleled in the genotype of *Dic* (Stebbing, 1910, p. 415), *Makrokyllindrus* (Stebbing 1912, p. 150) and in Calman's *Diastylis tubulicauda* and *D. fistularis* (Calman, 1905, p. 46 and 1911, p. 383; see also Zimmer, 1914, pp. 191-193).

Another point of interest is the fact that the branchial leaflets where examined in both *Dimorphostylis* and *Anchistylis* are digitiform and few in number, usually about ten or so in both sexes.

Finally, the pleopods of *Anchistylis* exhibit a departure from the usual type.

<sup>(1)</sup> No. 10, see Trans. Roy. Soc. S. Aust., 69, (1), 86-95.

## Genus LEPTOSTYLIS Sars

*Leptostylis* Sars, 1869, p. 343; Stebbing 1913, p. 123 (ref.); Hansen 1920, p. 71; Hale 1928, p. 47.

## KEY TO AUSTRALIAN SPECIES OF LEPTOSTYLIS

|                                      |                             |
|--------------------------------------|-----------------------------|
| Carapace covered with spinules. .... | <i>vercoi</i> Hale          |
| Carapace smooth. ....                | <i>recalvastra</i> sp. nov. |

*Leptostylis recalvastra* sp. nov.

*Ovigerous female*—Integument thin, semi-transparent, slightly calcified and clothed with scattered but quite prominent hairs.

Carapace two-sevenths of total length of animal and more than twice as long as pedigerous somites together; seen from above it is subtriangular in shape, broadest at rear end, where it is almost as wide as long and nearly half as wide

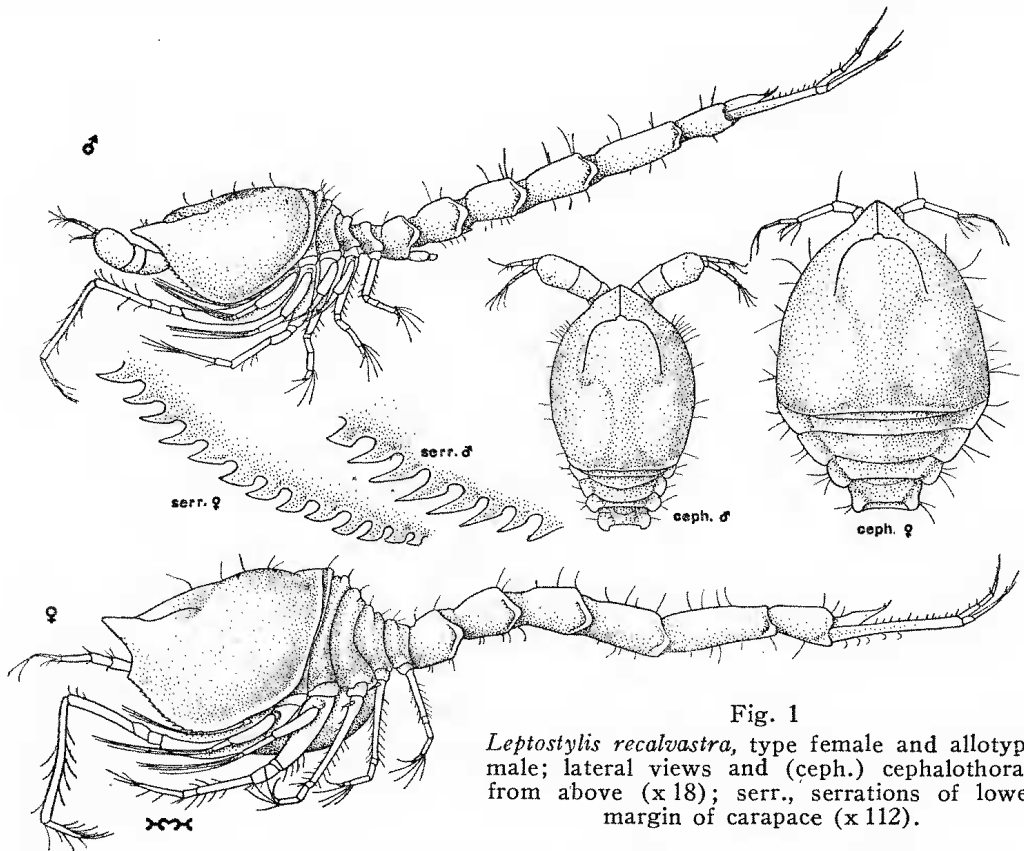


Fig. 1

*Leptostylis recalvastra*, type female and allotype male; lateral views and (ceph.) cephalothorax from above (x18); serr., serrations of lower margin of carapace (x112).

again as deep; seen from the side the upper profile is somewhat sinuate because of the swollen branchial regions, between which the dorsum is sulcate; there is a low boss on each side of frontal lobe at posterior end of sutures and outside the latter is a low fold, but the sides are without ridges or other sculpture save for faint pitting. Pseudorostrum subacute in front, the lobes meeting for a distance equal to one-sixth of length of carapace. Ocular lobe very small, unarmed, rounded, and without apparent lenses. Antero-lateral margin very shallowly concave, antero-lateral angle obtuse, and inferior margin posterior to it serrate, the teeth varying as shown in fig. 1.

Pedigerous somites each with a transverse fold; first partly concealed, the rest not differing much in length and not greatly expanded on sides.

Pleon half as long again as cephalothorax; fifth somite narrowing slightly to the rear, subcylindrical, as wide as deep and nearly three times as long as breadth; sixth somite only half as long as fifth and distinctly dilated posteriorly: telson about as long as sixth somite, armed with a pair of rather long apical spines and with a single pair of lateral spines; about one-fourth of its length is post-anal.

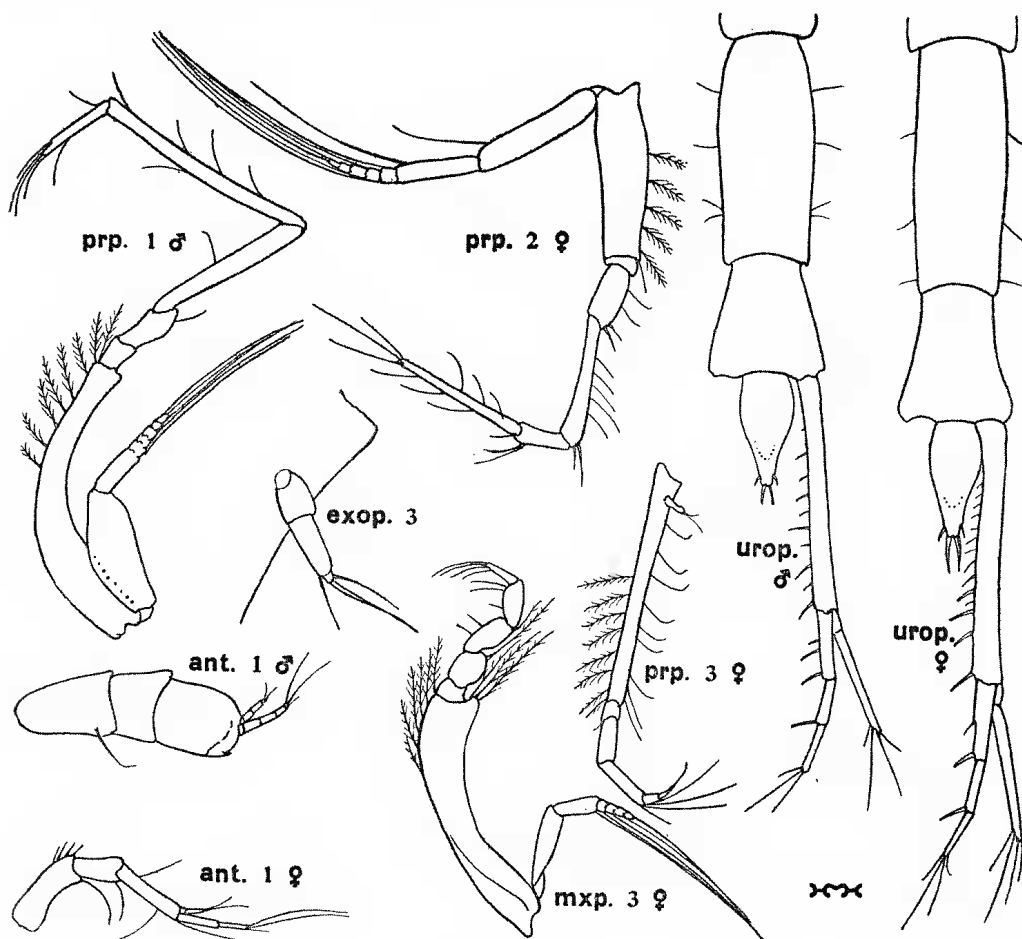


Fig. 2

*Leptostylis recalvastra*, paratypes ovigerous female and subadult male; ant., mxp. and prp., first antenna, third maxilliped and first to third pereopods ( $\times 43$ ); exop. 3, exopod of third pereopod ( $\times 180$ ); urop., uropod with fifth to sixth pleon somites and telson ( $\times 43$ ).

First antenna with first and third joints of peduncle subequal in length, each considerably longer than second; flagellum composed of two subequal joints, which together are almost as long as last segment of peduncle; accessory lash shorter than first joint of main flagellum, also two-jointed but with the first segment very short.

Mandible with ten or eleven spines, the anterior eight or nine of which are stout.

Third maxilliped slender, the basis nearly half as long again as rest of limb; merus, carpus, propodus and dactylus subequal in length.

First peraeopod long, the carpus reaching well beyond level of end of pseudo-rostrum; basis only about half as long as remaining joints together, propodus nearly two-thirds as long again as carpus and almost three times as long as dactylus.

Basis of second peraeopod only half as long as rest of limb; ischium distinct; carpus twice as long as merus, a little more than twice as long as propodus, and equal in length to the long dactylus.

Third and fourth peraeopods with basis longer than rest of limb and with merus shorter than carpus; propodal seta and longest carpal setae reaching well beyond tip of the slender dactylus; exopods three-jointed (the last segment minute) and furnished with three setae; fifth peraeopod with basis not longer than remaining joints together.

Peduncle of uropod distinctly more than twice as long as telson, the inner margin with a dozen irregular spines; endopod two-thirds as long as peduncle, three-jointed; first segment one-third as long again as second and with two spines on inner margin; second joint with one inner spine at distal end; third joint not quite as long as second and without spines on inner margin.

Length, 5.4 mm. Embryo, with pleon curved, 0.28 mm. Ova approximately 0.2 mm.

*Subadult male*—Carapace suboval in shape as viewed from above, widest at about middle of length, where it is less than one-third as broad again as depth; it is about two-sevenths of total length, and more than twice as long as pedigerous somites together; the antennal angle is not at all marked but the inferior margin is serrate (see fig. 1, serr. ♂); frontal lobe, etc., as in female.

Pleon fully half as long again as cephalothorax; telson and uropods as in adult female.

First antenna relatively very large, the last joint of peduncle globose, but the long hairs have not yet appeared; flagellum five-jointed, the first and last joints short, the others subequal in length; accessory lash four-jointed, and as long as first three segments of main flagellum; the proximal and distal joints are small, the other two elongate.

Length, 4.5 mm.

*Loc.*—New South Wales: four miles off Eden, 70 metres, in silt (allotype male, K. Sheard, Oct. 1943); five miles off Eden, 60 metres, on mud (type female, K. Sheard, submarine light, Dec. 1943); four miles east of Port Hacking, 80 metres, on mud (K. Sheard, A. Trawl, May 1944). Types in S. Aust. Museum, Reg. No. C. 2762-2763.

A second ovigerous female taken with the type is slightly smaller. Only immature males are available; in these the first pleopod, though still without setae, is large, but the second quite rudimentary.

This species in some respects closely resembles the Subarctic *gracilis* Stappers (male only—1908, p. 100, pl. i-iii), but differs in the slightly different proportions of the uropods, the much shorter basis of the first peraeopod, and the very large male first antenna.

#### Genus PARADIASTYLIS Calman

*Paradiastylis* Calman 1904, p. 173, and 1905a, p. 20, and 1911, p. 366; Zimmer, 1908, p. 181, etc., and 1936, p. 435; Stebbing, 1912, p. 146, and 1913, p. 121; Kemp, 1916, p. 398.



Two species are now recorded for Australia. *P. tumida* Hale (1937, p. 66, fig. 3) proves, by acquisition of the adult male, to belong elsewhere.

#### KEY TO SPECIES OF PARADIASTYLIS

- 1 Each side of carapace with at most one ridge. Distal end of male telson spiniform and without articulated terminal spines. .... *culicoides* Kemp  
Each side of carapace with at least three oblique ridges. Distal end of male telson not spiniform and with a pair of articulated spines. .... 2
- 2 First joint of endopod of uropod twice as long as second and third joints together. .... *brevicaudata* (Zimmer)  
First joint of endopod of uropod not longer than second and third joints together. .... 3
- 3 Peduncle of uropod much longer than combined lengths of sixth pleon somite and telson. .... *longipes* Calman  
Peduncle of uropod not longer than sixth pleon somite and telson together. .... 4
- 4 Each side of carapace with four oblique ridges. Propodus of first peraeopod short, not as long as merus and carpus combined. Propodus of second peraeopod three-fourths as long as either dactylus or carpus. .... *brachyura* Calman  
Each side of carapace with three oblique ridges. Propodus of first peraeopod elongate, considerably longer than merus and carpus combined. Propodus of second peraeopod only half as long as dactylus and much less than half as long as carpus. .... *mollis* sp. nov.

#### PARADIASTYLIS LONGIPES Calman

*Paradiastylis longipes* Calman 1905a, p. 21, fig. 4; Stebbing, 1913, p. 122 (ref.).

A single male from New South Wales (Cronulla, 8 feet, K. Sheard, Sept. 1942) departs from Calman's description in small details. The size is a trifle larger (3.7 mm.) but the body and appendages are just as described, except that the uropod differs in having 13 or 14 instead of about 20 inner spines, and in having the endopod relatively shorter; this has the joints armed with five, three and three inner spines respectively, but the first segment is relatively shorter, so that the ramus as a whole is not much longer than the exopod and is less than half as long as the peduncle. The integument, as stated by Calman, is membranous, and the three lateral ridges of the carapace are detected with difficulty; in the example in hand these are less oblique than shown in Calman's figure. The U-shaped ridge on the dorsum of the telson is pronounced and the short post-anal portion has a pair of apical spines, on each side of which are a shorter spine and a seta.

The species was previously known only from north of the Equator, in Malayan waters. Possibly the Australian form represents another species, but as the male now recorded agrees so closely in most details with that of *longipes* one hesitates to separate it on the grounds mentioned.

#### *Paradiastylis mollis* sp. nov.

*Ovigerous female*—Integument membranous; fragile and transparent.

Carapace ovate in shape as seen from above, wider than deep, about two-thirds as long again as deep; it is one-third of the total length of animal and twice as long as pedigerous somites together; each side has three oblique, curved ridges, the most anterior distinct, the others faintly defined; posterior half of dorsum with a deep and wide median gutter; the mid-line, as seen from the side, is excavate at the front of the first of the ridges and again (where it is armed with a small tooth) midway between this and the ocular lobe. Pseudorostrum subacute in front, one-fifth of total length of carapace. Ocular lobe moderately large, more than twice as wide as long, with no apparent lenses, but with a small tooth on each side; antero-lateral angle scarcely at all excavate and angle not defined.

First pedigerous somite partly concealed; fourth dorsally much the longest, as long as combined dorsal lengths of first to third somites.

Pleon not much longer than cephalothorax; fifth somite subcylindrical, twice as long as wide and almost twice as long as the sixth somite, which is not markedly dilated posteriorly; telson subcordate, as long as sixth somite, with short post-anal portion, armed with a pair of apical spines and two pairs of lateral spines, anterior to which are two pairs of short bristles.

Third segment of peduncle of first antenna one-fourth as long again as second; flagellum not much shorter than second peduncular segment and composed of two equal joints; accessory flagellum unisegmentate, nearly half as long as main lash. Second antenna four-jointed, the last segment minute, the third and fourth subequal in length.

Mandible with nine or ten spines, the last two of which are slender, the others unusually robust.

First peraeopod long, the carpus reaching almost to level of end of pseudo-rostrum; basis short, not greatly more than one-third as long as rest of limb and

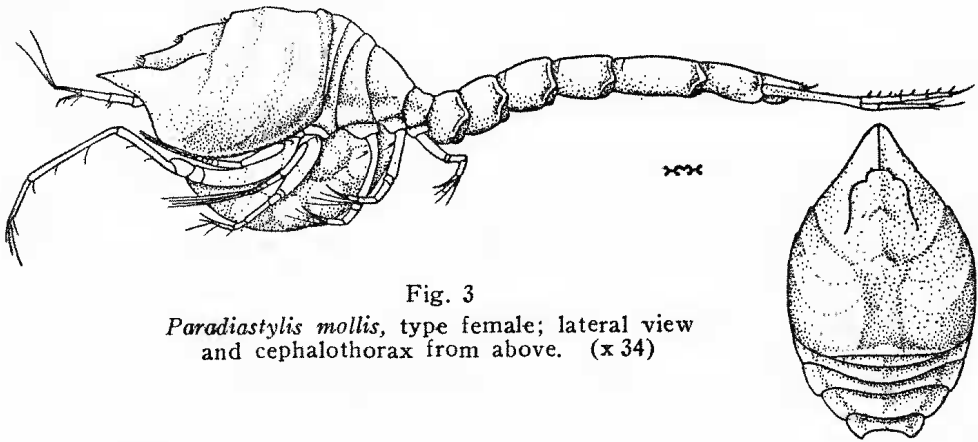


Fig. 3  
*Paradiastylis mollis*, type female; lateral view  
and cephalothorax from above. ( $\times 34$ )

not quite as long as propodus, which is almost half as long again as carpus and fully twice as long as dactylus.

Basis of second peraeopod also relatively short, not longer than rest of limb without dactylus; ischium distinct; carpus longer than dactylus (but shorter than dactylus plus propodus), twice as long as merus and nearly three times as long as propodus; longest dactylar setae equal in length to dactylus.

Basis of third peraeopod not as long as rest of limb, merus distinctly longer than carpus, and dactylus long and slender; fourth peraeopod little shorter than third, and fifth not much smaller than fourth; the propodal seta and two slender distal carpal setae in all the posterior legs reach beyond the tip of dactylus.

Uropod with peduncle twice as long as telson and armed on inner margin with nine or ten spines which successively increase in length in distal half; endopod not much shorter than peduncle, three-jointed, the first segment not quite twice as long as second which is barely as long as third; inner spines are respectively four, two and two, and the slender distal spine is equal in length to the third joint; exopod equal in length to the first two segments of endopod, with the longer of the distal spines two-thirds as long as the ramus.

Length, 2.58 mm. Ova, 0.164 mm. to 0.176 mm.

*Loc.*—Queensland: Moreton Bay, Myora Bight, surface (I. S. R. Munro, Stations 29 and 45, 50 cm. 40 m. net, 3.30 a.m. and 10.30 p.m., 29 Nov. 1940). Type in S. Aust. Museum, Reg. No. C.2765.

Another female has an extra spine on second joint of endopod of uropod. In this species the peduncle of this appendage is much shorter than in *longipes* Calman, being only twice as long as the telson, as in *brachyura* Calman (1904, p. 174, pl. v, fig. 76-90); the last-named species, however, has the rami shorter in relation to the peduncle and the exopod little shorter than the endopod, the second segment of which is longer than the third according to Calman's figure,

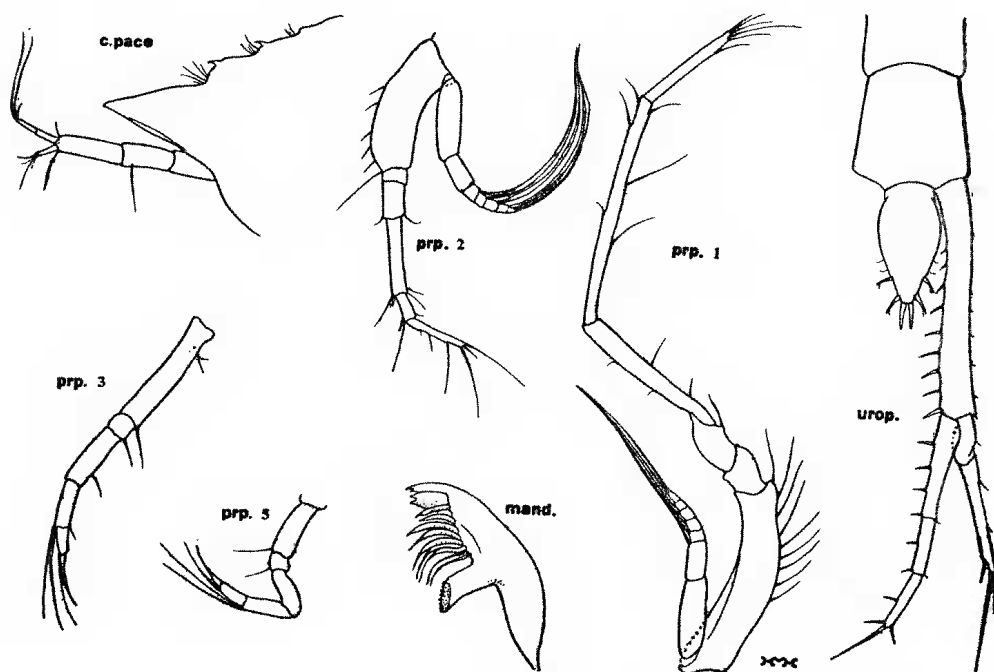


Fig. 4

*Paradiastylis mollis*, type female: c pace, anterior portion of carapace and first antenna (x75); mand., mandible (x125); prp., first, second, third and fifth pereopods (x75); urop., uropod with sixth pleon somite and telson (x75).

while the very different proportions of the joints of the first and second pereopods, the shorter carpal and propodal setae of the posterior legs, and the presence of four ridges on each side of the carapace provide other differences.

#### Genus DIMORPHOSTYLIS Zimmer

*Dimorphostylis* Zimmer 1921, p. 144, and 1936, p. 435; Foxon, 1932, p. 390; Hale, 1936, p. 403.

If Zimmer's genotype material is all referable to the one species this is unusual in the very marked differences between the telson of female and adult male. What is more extraordinary is the fact that in the young male the telson has no distinct post-anal part (as in the young female) but that this appears in the adult male.

Examination of the Australian Diastylids so far in hand and, as previously noted, representing upward of 40 species, forces one to the conclusion that the relative length, and armature, of the post-anal part of the telson cannot be regarded as reliable generic characters; this is discussed under the genus *Gynodiastylis*, which is dealt with in another paper. The species now placed in *Dimorphostylis* differ so much in this respect that the generic name becomes apt in still another direction! (see Zimmer *ut supra*, p. 148).

As Zimmer himself states, the genus is close to *Paradiastylis*; broadening the diagnosis to admit Foxon's *australis*, *cottoni* Hale, and the new species described below, it differs only in having an exopod on the third maxilliped of the female. The males of both *Dimorphostylis* and *Paradiastylis* are distinguished from *Diastylis* by the expanded basis of the peraeopods, but the inclusion in the first-named genus of species with two instead of three terminal spines on the telson makes it difficult to find characters to separate males of this genus from those of *Paradiastylis*. Difficulties arise also if females alone are concerned; in the present case *colefaxi* sp. nov. is referred here rather than to *Diastylis* only because in *Dimorphostylis*, as in *Gynodiastylis*, etc., there is a tendency towards extreme reduction of the post-anal part of the telson.

Exopods are entirely absent on the third and fourth peraeopods of the females of the species now dealt with; in this detail they are distinct from the forms placed in *Leptostylis*. The males, where known, have the flagellum of the second antenna longer than is recognised for *Leptostylis*.

#### KEY TO SPECIES OF DIMORPHOSTYLIS

- |   |                                                                                                                                                                                                                                                                                |                             |   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---|
| 1 | Preanal portion of telson much longer than sixth pleon somite ....                                                                                                                                                                                                             | <i>australis</i> Foxon      | 2 |
|   | Preanal portion of telson shorter than sixth pleon somite. ....                                                                                                                                                                                                                |                             |   |
| 2 | Sides of carapace covered with short spines. ....                                                                                                                                                                                                                              | <i>subaculeata</i> sp. nov. |   |
|   | Carapace not spiny or with spines confined to anterior portion. ....                                                                                                                                                                                                           |                             | 3 |
| 3 | Each lateral margin of telson with a non-articulated tooth. ....                                                                                                                                                                                                               |                             | 4 |
|   | Lateral margins of telson entire (articulated spines or bristles present). ....                                                                                                                                                                                                |                             | 5 |
| 4 | Carapace with distinct lateral carinae posterior to level of frontal lobe. Basis of second peraeopod shorter than rest of limb, with a strong distal tooth; ischium and merus of this limb also with inner teeth. Second segment of endopod of uropod shorter than third. .... | <i>inauspicata</i> sp. nov. |   |
|   | Carapace with no distinct carinae posterior to level of frontal lobe. Second peraeopod without teeth, its basis as long as rest of limb. Second segment of endopod of uropod longer than third. ....                                                                           | <i>tasmanica</i> sp. nov.   |   |
| 5 | First segment of endopod of uropod not much longer than second. ....                                                                                                                                                                                                           | <i>vieta</i> (Hale)         |   |
|   | First segment of endopod of uropod longer than second and third segments together. ....                                                                                                                                                                                        |                             | 6 |
| 6 | Carapace with low folds but no clear-cut ridges. First peraeopod short, with propodus not as long as carpus. ....                                                                                                                                                              | <i>colefaxi</i> sp. nov.    |   |
|   | Carapace with sharply defined lateral ridges. First peraeopod long, with propodus much longer than carpus. ....                                                                                                                                                                |                             | 7 |
| 7 | Carapace with at least four carinae on each side, between hinder end of frontal lobe and posterior margin. Carpus of second peraeopod distinctly longer than combined lengths of propodus and dactylus ....                                                                    | <i>cottoni</i> Hale         |   |
|   | Carapace with three carinae on each side between hinder end of frontal lobe and posterior margin. ....                                                                                                                                                                         |                             | 8 |
| 8 | Carapace without spines. Telson of young male and female with no distinct post-anal part and no lateral spines. Carpus of second peraeopod not much longer than merus. ....                                                                                                    | <i>asiatica</i> Zimmer      |   |
|   | Anterior part of carapace with spines; first lateral carina spiny. Telson of female with distinct post-anal part, armed with lateral spines. Carpus of second peraeopod almost twice as long as merus. ....                                                                    | <i>tribulis</i> sp. nov.    |   |

#### DIMORPHOSTYLIS AUSTRALIS Foxon

*Dimorphostylis australis* Foxon 1932, p. 390, fig. 7-8.

Foxon's specimens were secured by the Great Barrier Reef Expedition at Low Isles, Queensland (lat. 16° 23' S.). Males occur in material from several of Mr. I. S. R. Munro's stations in Moreton Bay (lat. 27° 18' S.), and it is possible to supplement the brief description of that sex.

*Adult male*—Integument membranous, transparent.

Carapace more than twice as long as pedigerous somites together, one-third of total length of animal (one-fourth in female, *vide* Foxon), considerably wider than deep and twice as long as greatest depth; seen from the side its dorsum is but slightly arched; from above its greatest width occurs at the level of ocular lobe; sides with three faintly defined, oblique, and forwardly curved ridges, not meeting on dorsum but separated by a wide longitudinal gutter. Antero-lateral margin oblique, very slightly sinuate, and antero-lateral angle widely rounded, not dentate. Pseudorostrum narrowly truncate as viewed from above, subacute as seen from the side; lobes meeting for a distance equal to one-sixth of total length of carapace. Ocular lobe large, rounded, very slightly constricted at base, twice as wide as long and with three large, unpigmented, corneal lenses.

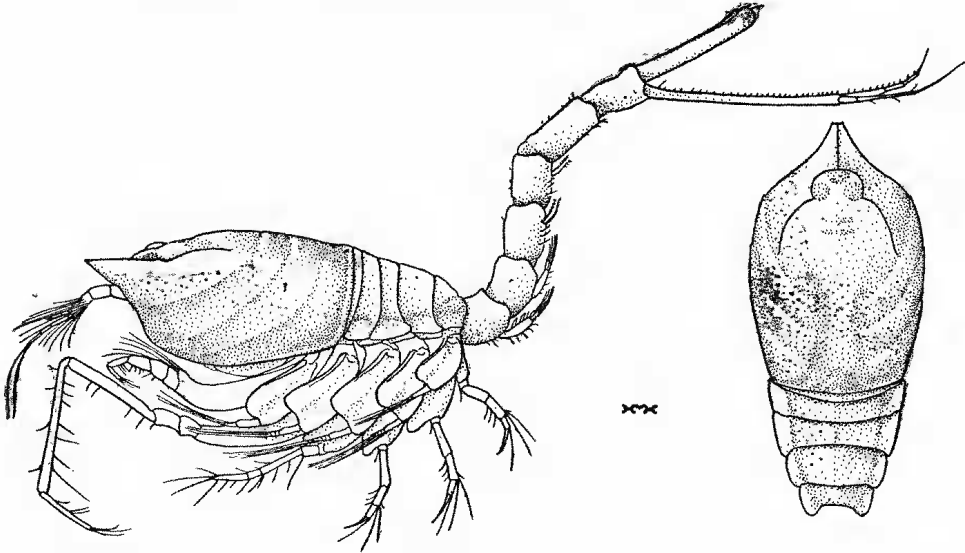


Fig. 5

*Dimorphostylis australis*, adult male; lateral view and cephalothorax from above (x20).

First pedigerous somite very short; fourth a little longer than any of the others; pleural parts not greatly dilated, but third expanded both fore and aft.

Pleon longer than cephalothorax by half the length of telson; fifth somite subcylindrical, half as long again as wide and one-fourth as long again as sixth somite, which is slightly broadened posteriorly, where it is as wide as long; on each side of distal end of ventral gutter of third and fourth somites there is a pair of strong setae, plumose for part of their length; the almost cylindrical telson is fully as long as fifth and sixth pleon somites together, more than four times longer than greatest width, without any post-anal part, and with a pair of tiny dumb-bell-shaped terminal spines, flanked on each side by a bristle; in posterior third the dorsum is marked by a depression, with a U-shaped raised margin.

First antenna with first joint longer than third, which is distinctly longer than second and is furnished with a brush of dense sensory hairs, emanating from an oval area occupying the greater part of length on one side; flagellum as long as second and third peduncular joints together, four-jointed, the first segment very short, the second longer than subequal third and fourth combined; accessory lash more than half as long as main flagellum, four-jointed, the proximal and distal segments short and second segment shorter than third, which is about half the length of the whole flagellum.

Second antenna with flagellum reaching at least to end of peduncle of uropod, sometimes to distal ends of rami of that appendage.

Third maxilliped with the dilated basis half as long again as rest of limb, the segments of which successively increase in length to the propodus, which is half as long again as dactylus.

First peraeopod elongate, the carpus reaching to level of tip of pseudo-rostrum; basis half as long as rest of limb with the usual distal brush of finely plumose setae; propodus nearly half as long again as carpus and distinctly more than twice as long as dactylus.

Second peraeopod with basis, including distal lobe, longer than remaining joints together; carpus as long as propodus and dactylus together and more than twice as long as merus.

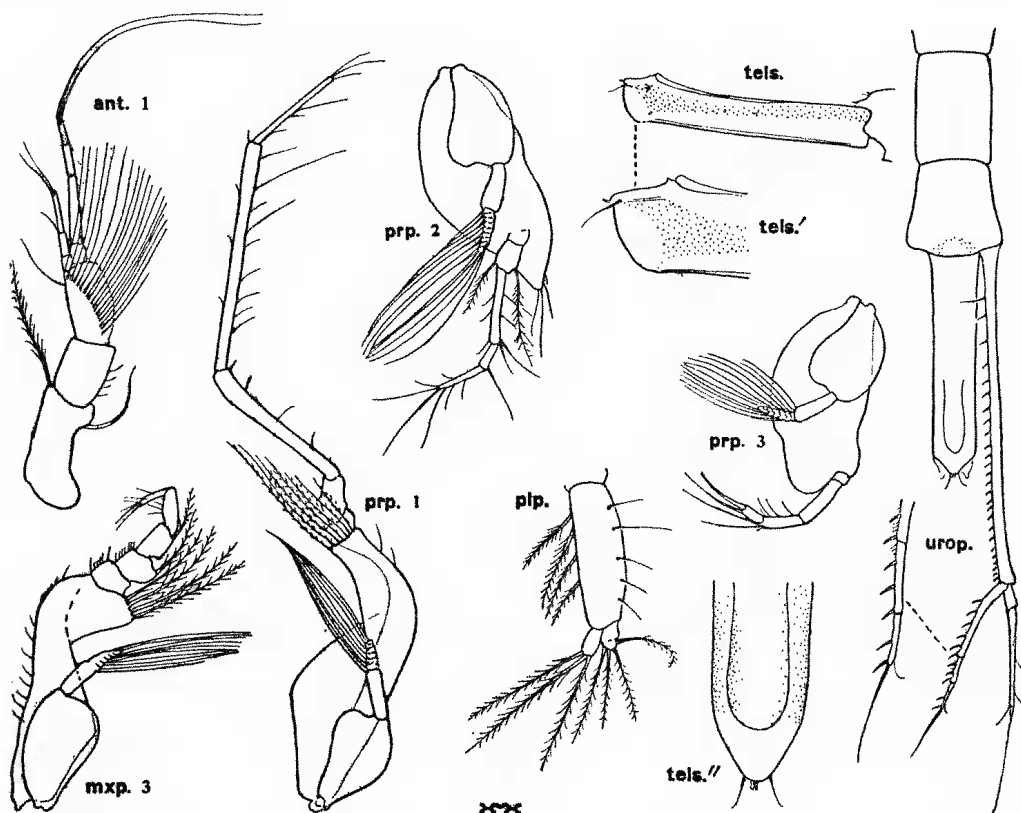


Fig. 6

*Dimorphostylis australis*, adult male; ant., first antenna (x65); mxp. and prp., third maxilliped and peraeopods (x34); plp., pleopod (x90); urop., uropod with fifth to sixth pleon somites and telson (x34; distal joints of endopod, x65).

Basis of third and fourth peraeopods about as long as rest of limb, that of fifth much shorter; merus in all posterior legs shorter than carpus and propodus together; longest carpal and propodal setae reaching a little beyond tip of dactylus.

Peduncle of pleopods robust; rami small, the exopod indistinctly two-jointed.

Peduncle of uropod fully half as long again as telson, more than two and one-third times as long again as endopod, and with about 25 short spines on inner margin, preceded by a bristle; endopod with first joint more than half as long again as second and third segments together, and with second joint one-third as long again as third; inner spines are usually six plus three plus two and the slender terminal seta is as long as the last two joints together; exopod a little

shorter than endopod, with the long distal seta not much shorter than the second joint of the ramus.

Length, 4.9 mm. to 5 mm.

***Dimorphostylis subaculeata* sp. nov.**

*Ovigerous female*—Integument thin, but calcified and firm. Armed with spinules, which are numerous and closely set on carapace.

Carapace robust, one-third of total length of animal, twice as long as deep, and fully half as wide again as deep; seen from above the sides are subparallel in posterior half, tapering rapidly to the front; the branchial regions are swollen and between them the dorsum is sulcate; there is a deep pit on each side of rear end of frontal lobe. Pseudorostrum subacute in front, the lobes meeting for a distance equal to almost one-fifth of length of carapace. Antero-lateral margin very shallowly concave; antennal angle rounded and, like inferior margin, spinulose. Ocular lobe rounded, more than twice as wide as long, spinulose but without apparent lenses.

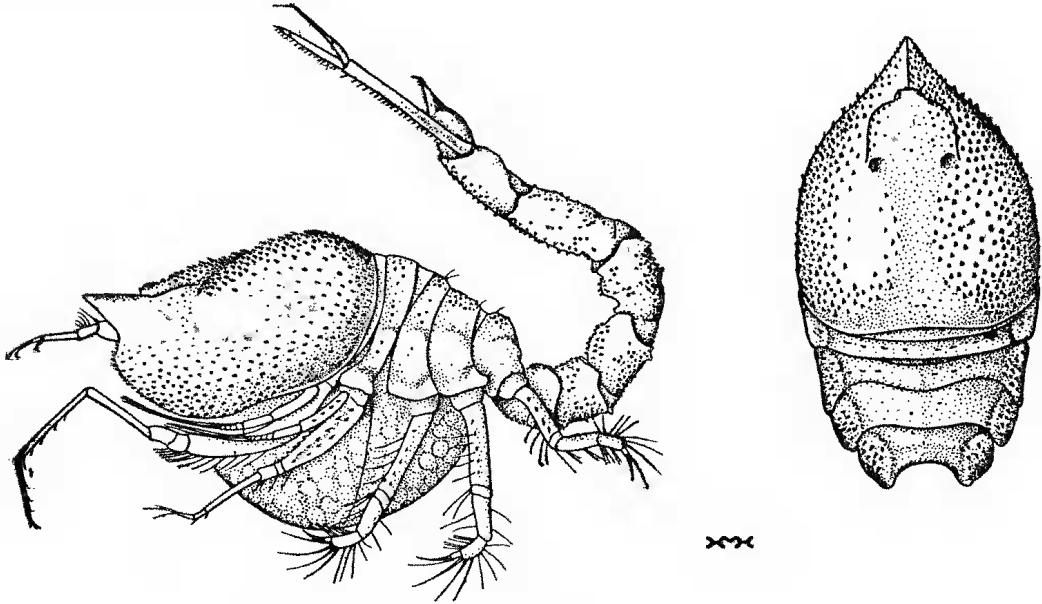


Fig. 7

*Dimorphostylis subaculeata*, type female; lateral view and cephalothorax from above (x9).

Pedigerous somites together more than half as long as carapace; first partly concealed; fourth and fifth dorsally longer than second or third; pleural parts not greatly expanded, but second and third legs a little more widely separated than the others.

Pleon about as long as cephalothorax; fifth somite subcylindrical, slightly narrowed towards distal end and fully one-third as long again as sixth somite, which is somewhat expanded posteriorly, where it is almost as wide as long; telson not much shorter than sixth somite, with two-fifths of its length post-anal; it is armed with a pair of short, stout, terminal spines and two pairs of lateral spines, anterior to which on each side is a row of short bristles.

First antenna with first segment of peduncle a little longer than third and half as long again as second; the flagellum is composed of two subequal joints,

is half as long as the last peduncular joint, and fully twice as long as the three-jointed accessory lash, which has the proximal and distal segments very short.

Second antenna four-jointed; the first segment bears two long plumose setae, the second and third joints each one similar seta and the short, conical, terminal segment one plain seta.

Mandible with 19 to 20 spines in the row (fig. 9 A).

First maxilliped with 10 digitiform gill-lobes. Third maxilliped with exopod more than half as long as the basis, which is twice as long as remaining joints together, and has the external distal angle rounded, not forwardly produced or expanded, and furnished with a fan of half-a-dozen plumose setae; ischium with a tooth at outer distal angle; carpus and propodus subequal in length, each a little longer than either merus or dactylus.

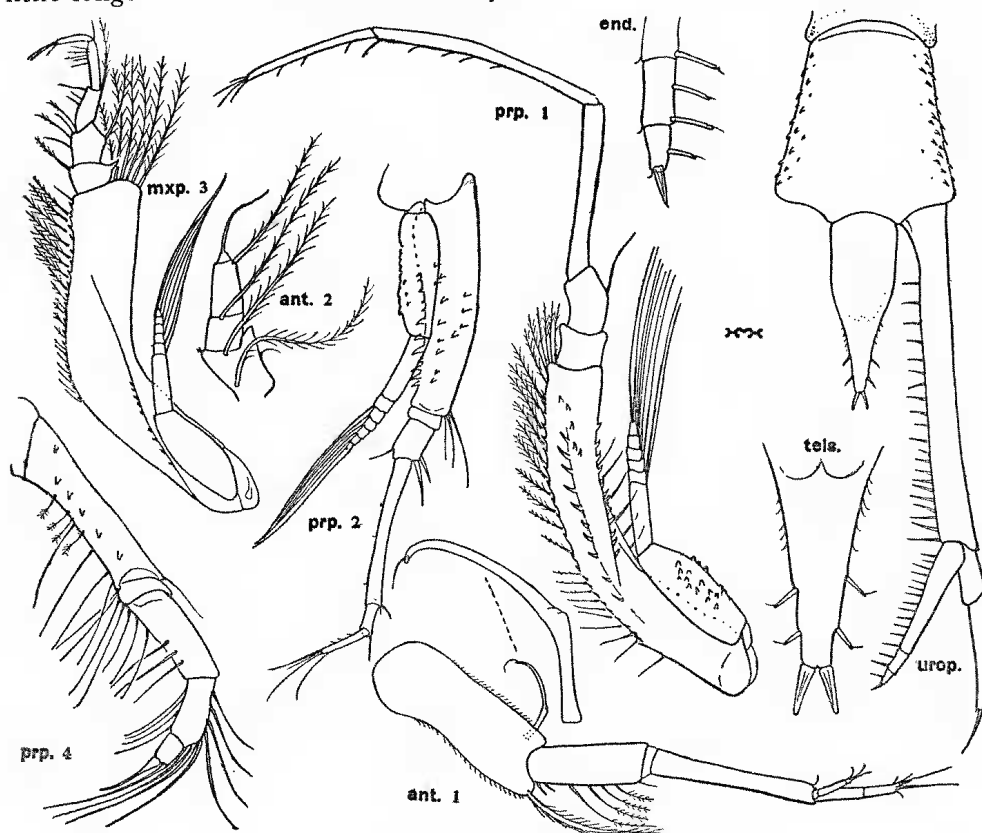


Fig. 8

*Dimorphostylis subaculeata*, type female; ant., first and second antennae (x44; seta, x135); mxp. and prp., third maxilliped, first, second, and fourth peraeopods (x22); urop., uropod with sixth pleon somite and telson (x22); tels., post-anal portion of telson (x55); end., distal joint of endopod of uropod (x60).

First peraeopod long, the carpus reaching just beyond antero-lateral angle of carapace; basis spinose, not dilated, less than two-thirds as long as rest of limb; propodus fully as long as merus and carpus together, and three-fourths as long again as dactylus.

Basis of second peraeopod shorter than rest of limb by the length of dactylus; ischium distinct, relatively large; carpus slender, more than three times as long as merus and fully four times as long as propodus, which is not much more than half as long as the dactylus.



Third to fifth pereopods stout, with numerous long setae; basis (as in second) spinose, in the third and fourth pairs about as long as rest of limb without dactylus, in the fifth shorter than this; merus quite as long as carpus and propodus together; dactylus long and slender; the outer face of carpus bears near distal end three stout setae (preceded by four or five more slender setae), and these, together with propodal seta, form a stout rake which extends well beyond tip of dactylus.

Peduncle of uropod twice as long as telson and fully twice as long as the rami, which are equal in length; its inner margin bears 19 to 21 spines; endopod three-jointed, the first segment fully three times as long as the combined lengths of the last two joints, the second not quite half as long again as the short terminal joint; inner spines of the respective segments, on both endopods, are twelve plus two plus one and the terminal spine, much stouter than the others (fig. 8, end.) is not as long as the distal joint; exopod with two terminal spines, one minute, the other less than one-third as long as the ramus.

Colour white. Length, 12.1 mm. Embryos in marsupium very numerous, small in relation to size of animal and, with pleon curved against back, 0.34 mm. to 0.39 mm. in length.

*Loc.*—Tasmania: Marion Bay, 10-17 fms., amongst kelp (W. S. Fairbridge, Euphausiid bottom net, Dec. 1944). Type in S. Aust. Museum, Reg. No. C. 2745.

***Dimorphostylis subaculeata* var. *praecox* nov.**

*Ovigerous female*.—Armature of body and proportions of body and segments of appendages as in Tasmanian form. Differs in the smaller size and in having fewer spines in the mandible row (13 to 14) and a lesser number of spines arming the inner margins of peduncle and endopod of uropod. In the type, 8.8 mm. in length, these number 13 on peduncle and six plus two plus one on the endopodal joints. The largest ovigerous females are 9.3 mm. in length and have 17 spines on the peduncle, and on the endopod seven or eight plus two plus one.

*Young females*.—The spines of the carapace are sparser than in the adult, and there are fewer inner spines on the uropod. It is evident that in the case of the female the spines of this appendage increase more or less regularly in number as the animal grows. The smallest available example is 4.6 mm. in length and has the peduncle of the last-named appendage armed with only nine spines, that of endopod with three plus two plus one. In a subadult female 7 mm. in length the armature is much as in the type. The telson has about one-third of its length post-anal even in the young and bears one or two pairs of lateral spines (rarely there is a third spine on one side, fig. 9, urop. ♀); this variation has no relation to the size of the animal.

Embryos in the marsupium are the same size as those of the large Tasmanian female.

It would seem that this form, which was taken in waters slightly warmer than those of Marion Bay, the Tasmanian type locality, passes through fewer ecdyses before becoming ovigerous.

*Adult male*.—Integument less calcified than in female; spiny armature sparser and tending on sides of carapace to become blunted.

Carapace only about two-sevenths of total length of animal, two-thirds as long again as pedigerous somites, more than twice as long as deep and half as broad again as deep; seen from above it is suboval, tapering to the front in anterior third. Pseudorostrum subacute in front, the lobes meeting for a distance equal to little more than one-sixth of length of carapace. Antero-lateral margin oblique, slightly sinuate, scarcely at all excavate; no antennal angle, the margin

forming a wide curve to the inferior edge, which is finely spinulose. Ocular lobe rounded, larger than in female, more than twice as wide as long and with three prominently raised but colourless corneal lenses.

Pleon, not including telson in the length, as long as cephalothorax; fifth somite narrowed slightly towards the rear, and half as long again as sixth, which is less widened posteriorly than in female; telson as long as sixth somite, with a pair of stout terminal spines and two pairs of much smaller lateral spines.

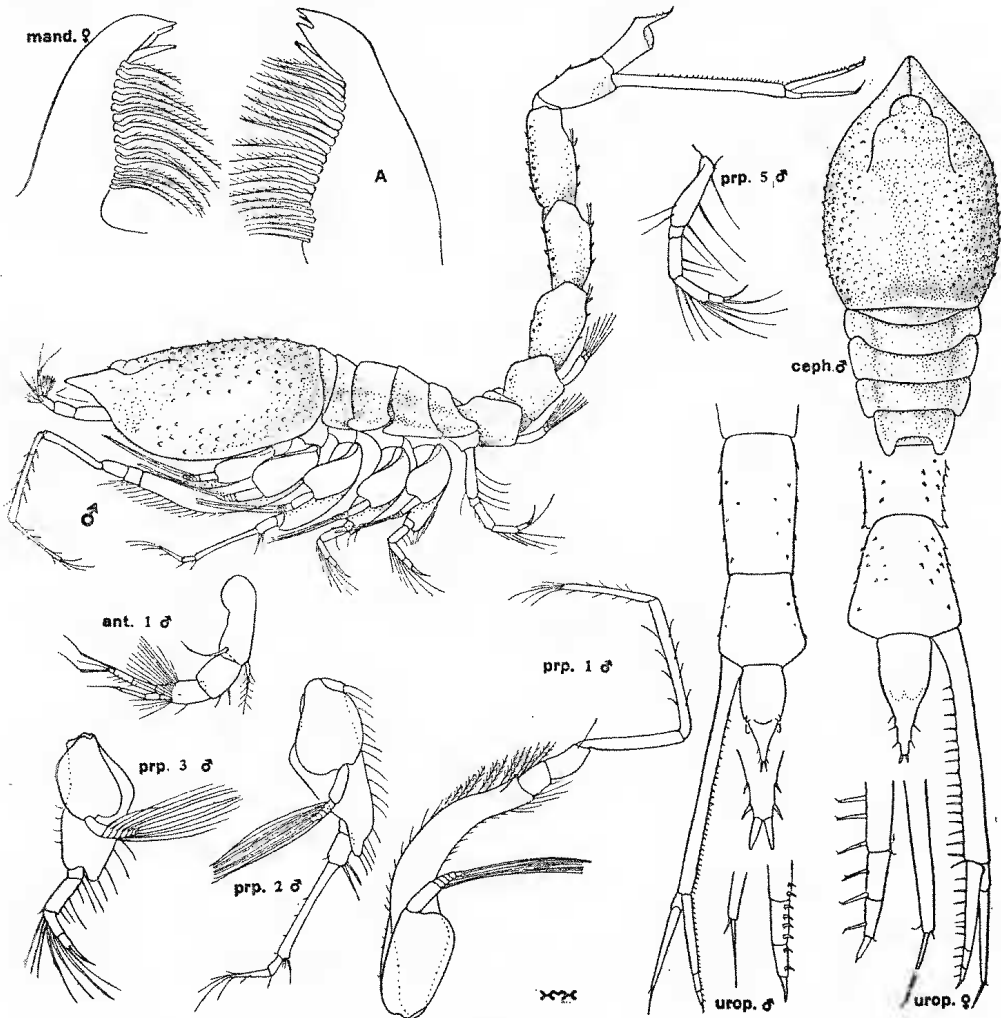


Fig. 9

*Dimorphostylis subaculeata*, var. *praecoxa*, adult male and 9.3 mm. ovigerous female; lateral view of male and (ceph.) cephalothorax from above (x 12); ant., first antenna (x 30); mand., distal portion of mandible (x 80); A, mandible of Tasmanian type ovigerous female for comparison, x 80); prp. and urop., pereopods and uropod with telson, etc. (x 20; distal parts of rami of uropod, x 52).

First antenna stouter than in female; first peduncular joint nearly twice as long as either second or third segments, which are subequal in length; third not much narrower than second and furnished with a dense brush of sensory setae; flagellum one-third as long again as last peduncular segment, four-jointed, the distal and proximal joints very short, the other two subequal in length; accessory lash as long as distal joint of peduncle, four-jointed, the third segment much the

longest and the terminal one minute. Second antenna with flagellum reaching to end of pleon.

Mandibles with 11 to 12 spines in the row.

First peraeopods relatively a little longer than in female, the carpus reaching slightly beyond level of end of pseudorostrum; basis two-thirds as long as rest of limb; proportions of other joints as in female, save that the dactylus is a trifle longer.

Basis of second peraeopod, including distal lobe in the length, shorter than remaining joints together; ischium distinct; other segments as in female excepting that dactylus is slightly longer.

In the third and fourth peraeopods the wide basis is fully as long as the rest of limb, the setae of which are as in female; fifth peraeopod about three-fourths as long as fourth, with the narrow basis only two-thirds as long as rest of limb.

Peduncle of uropod slender, two and one-half times as long as telson and distinctly more than twice as long as endopod; its inner margin bears thirty or more spines, much shorter than those of female; endopod exceeding exopod in length by almost the length of its distal joint; first segment fully two-and-one-half times as long as second and third together; second joint less than half as long again as third; inner spines 16, plus three or four, plus two; terminal spines of both rami as in female.

Both pairs of pleopods biramous, the exopod two-jointed.

Colour, semi-transparent. Length, 9 mm.

An adult male, 8 mm. in length and taken in company with females at Ulladulla, has the spines on the inner margin of the three endopod joints of the uropod twenty-two plus five plus two.

Subadult males have the carapace shaped more as in the young females, with similar armature and with about the same number of spines (longer than in adult male) on the uropods. An example 8.1 mm. in length (with the setae of the pleopods and exopods of third and fourth peraeopods very short) has only about 17 spines on the peduncle of this appendage and nine plus two plus one on the endopod. This example has the basis of the peraeopods a trifle wider than in the adult female, but not greatly expanded and distally produced as in the adult male.

*Loc.*—New South Wales: off Jibbon, on sand, 35 fms. (K. Sheard, submarine light, 1940); Cronulla, 8 feet on sand (K. Sheard, submarine light, Sept. 1942); off Jibbon, 50 metres on sand (dredged, K. Sheard, June 1943), and 40-70 metres, on sand (K. Sheard, A. Trawl Station 6, 9 and 10, July-Aug. 1943); off Ulladulla, 75 metres (K. Sheard, A. Trawl, June 1944). Types in S. Aust. Museum, Reg. No. C. 2754 and 2767.

This species resembles the Western Australian *Leptostylis vercoi* (Hale 1928, p. 47, fig. 17), which, like other members of its genus, has small exopods on the third and fourth legs of the female; the appendages show relatively slight differences, in the uropods, for instance, the peduncle is a little shorter, and the first joint of the endopod is only twice as long as second and third segments together.

#### ***Dimorphostylis inauspicata* sp. nov.**

*Subadult male*—Integument thin, not much calcified, but tough and not easily torn.

Carapace one-third of total length of animal and twice as long as pedigerous somites together; it is a little wider than deep and almost half as long again as deep; each side with four ridges curving obliquely forwards; the most anterior ridge is short and serrate and arises near posterior end of frontal suture; the second, more feebly serrate, commences near the mid-line and terminates close to

the upper part of first; it is almost joined near mid-line by a fainter carina which in turn is met by the fourth; in addition to these a short, sinuate, serrate ridge arises near end of pseudorostrum, curves backwards and downwards, and is continued as a much fainter carina, subparallel to inferior margin and reaching to hinder edge; anterior half of carapace from ocular lobe to branchial regions is elevated medianly, the rounded ridge sinuate as viewed from the side and armed with three small teeth, one at base of ocular lobe and two (one behind the other) at rear end of frontal lobe; there is also a pair of tiny denticles on the ocular lobe; the lateral ridges are somewhat broken and this, together with the slight depressions between them, results in an irregularity of the outline of the sides when the animal is viewed from above; branchial regions somewhat elevated dorsally, leaving between them in posterior half of carapace a rather deep sulcus; pseudorostrum depressed, each lobe with a small point anteriorly; lobes meeting for a distance equal to about one-sixth of length of carapace; antero-lateral margin

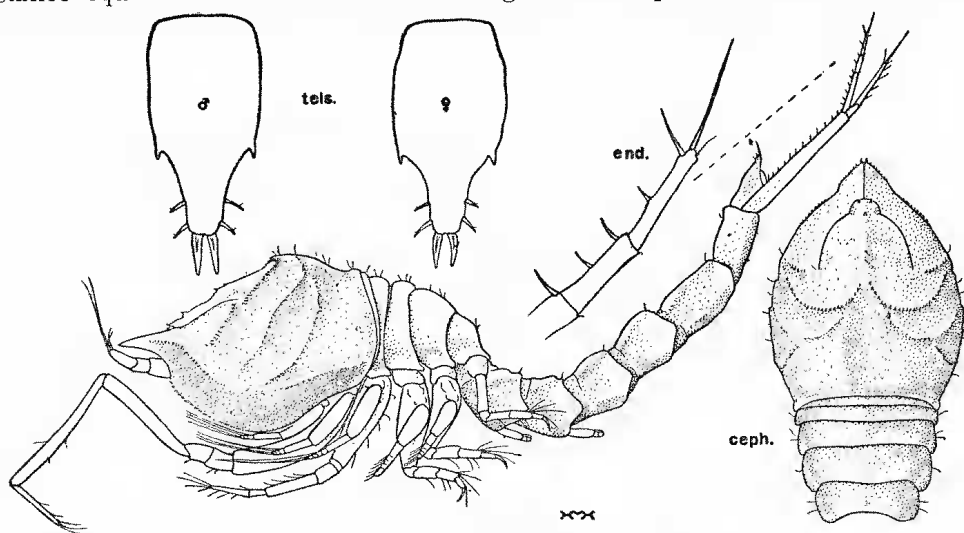


Fig. 10

*Dimorphostylis inauspicata*, type male; lateral view and (ceph.) cephalothorax from above ( $\times 16\frac{1}{2}$ ); end., distal joints of endopod of uropod ( $\times 80$ ); tels., telson of paratype male and allotype female ( $\times 56$ ).

very shallowly concave; antero-lateral angle rounded and, like inferior margin posterior to it, finely serrate; ocular lobe rounded, twice as wide as long, with faint indications of eye-spots.

Pedigerous somites successively increasing in dorsal length to fourth, which is a little longer than fifth; each is marked with a fine median dorsal line and has the pleural parts not much expanded.

Pleon fully as long as cephalothorax; somites one to five with a dorso-lateral and infero-lateral carina on each side, the lateral space between them concave; sixth somite depressed, keeled laterally, slightly widened posteriorly and about four-fifths as long as fifth; telson four-fifths as long as sixth somite, with a small tooth beyond middle of length of each lateral margin and with only a short post-anal portion, armed with a pair of terminal spines and two pairs of lateral spines.

Antennae not fully developed. First segment of peduncle of first pair twice as long as second joint, longer than the swollen third, and with a distal spine, as well as the usual stout seta and plumose seta; each flagellum four-jointed, the main lash half as long again as the other and as long as third peduncular joint.

Mandible with 13 to 14 spines.

Third maxilliped with basis quite half as long again as rest of appendage, with a tooth at inner distal angle and margin posterior to this in part serrate; ischium and merus each with an inner tooth.

First peraeopod long, the carpus reaching beyond level of end of pseudo-rostrum; basis relatively short, not quite half as long as rest of limb; propodus almost equal to combined lengths of ischium, merus and carpus, and a little more than twice as long as dactylus.

Basis of second peraeopod broad (presumed to be forwardly produced distally in adult), serrate on inner edge and with a large tooth, preceded by a

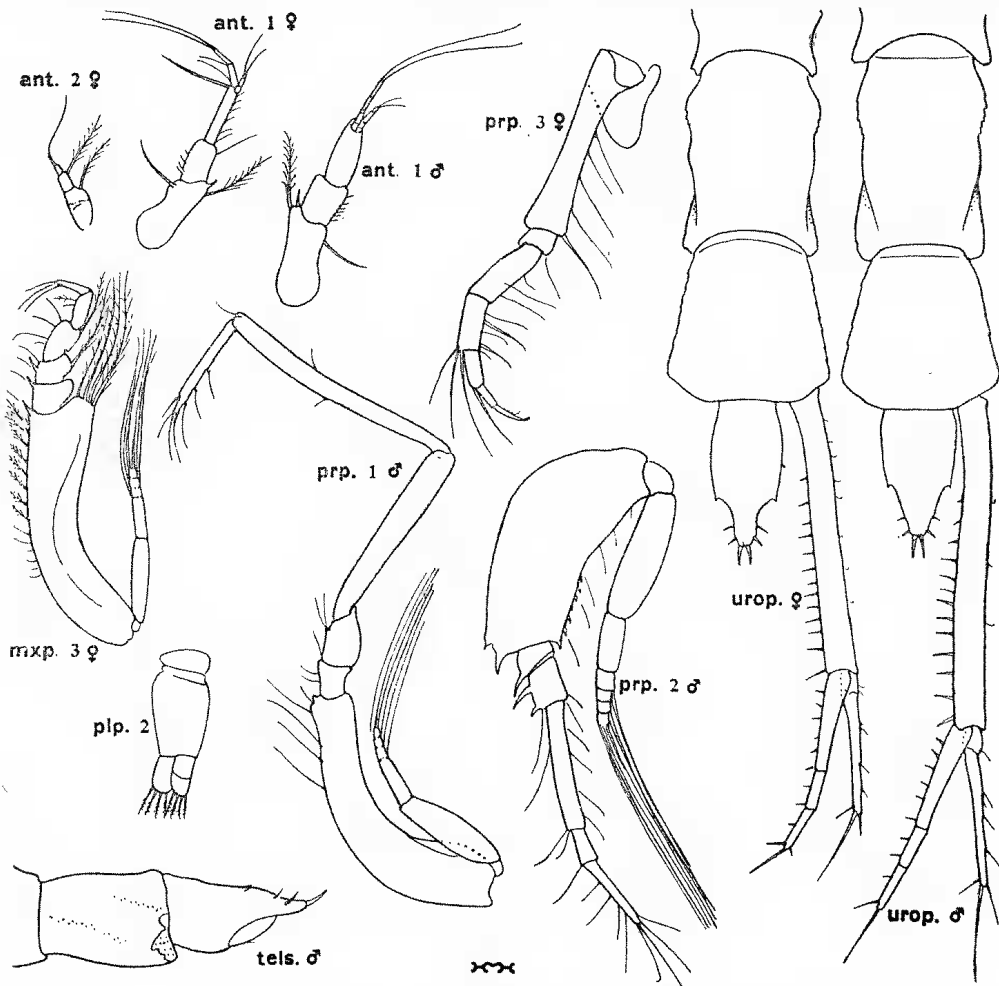


Fig. 11

*Dimorphostylis inauspicata*, paratypes male and subadult female; ant., first and second antennae; mxp. and prp., third maxilliped and first to third peraeopods; urop., uropod, telson and fifth to sixth pleon somites; tels., lateral view of telson (all  $\times 37$ ); plp. 2, second pleopod ( $\times 70$ ).

smaller tooth, at outer distal angle; it is not as long as rest of limb; ischium distinct, armed with a large outer tooth; merus with two teeth on outer margin; carpus three times as long as merus and nearly four times as long as propodus, which is not quite half as long as dactylus.

Basis broad in third and fourth peraeopods, and about as long as remainder of limb; merus nearly as long as carpus and propodus together; fifth peraeopod

with basis barely wider than, and not much more than half as long as, remainder of limb; three distal carpal setae, successively increasing in length, the longest (like the propodal seta) reaching to the level of tip of slender dactylus.

Peduncle of uropod two and three-fourths times as long as telson, three-fourths as long again as endopod, and with 13 spines on inner margin; endopod three-jointed, the first segment a little longer than second and third combined; second joint slightly shorter than third; inner spines of segments of endopod six plus two plus two, and terminal spine distinctly longer than last segment; exopod about as long as first two joints of endopod together, and with longest terminal spine more than half as long as ramus.

Both pairs of pleopods, though incompletely developed and with short setae, have the exopod two-jointed, and the endopod not divided.

Colour, white. Length, 5.6 mm.

*Female with developing marsupium*—General form as in the young male illustrated.

First antenna differing from that of male in having the third joint narrow, the main flagellum consisting of two segments and the accessory of three short joints. Second antenna apparently four-jointed, the small terminal segment capped with a plain seta.

Armature and proportions of thoracic appendages as in the young male, excepting that the basis in the second to fourth pereopods is much narrower. An exopod is present on the third maxilliped but is more slender than in the male. There are no exopods on the third and fourth legs.

Telson and uropods are as described but with peduncle of last-named only half as long again as endopod.

Length, 5.7 mm.

*Loc.*—New South Wales: Ulladulla, Brush Island, 45 fms., in fine silt on flathead grounds (D. Rochford, Jan. 1945). Types in S. Aust. Museum, Reg. No. C.2703.

The females available are not in good condition.

#### ***Dimorphostylis tasmanica* sp. nov.**

*Female with developing marsupium*—Integument thin but slightly calcified with surface dull.

Carapace plump and shaped as in *tribulis*; it is about one-third of total length of animal and twice as long as pedigerous somites together; antero-lateral fold armed with a row of strong teeth, posterior to which is a patch of smaller teeth, while there are scattered spines on anterior part of sides; mid-line of dorsum, posterior to ocular lobe with three conspicuous teeth, placed one behind the other, and at about middle of length with a couple of small spines; to the rear of antero-lateral fold the sides are shallowly pitted and bear exceedingly faint indications of three oblique furrows, not at all like the defined carinae of *tribulis*; branchial regions somewhat swollen and elevated on dorsum, where there is a deep median gutter between them; seen from the side the dorsal profile is irregular because of these elevations, the tumid ocular lobe, etc. Antero-lateral margin shallowly concave and antero-lateral angle with a tooth which is the first of a series running back along front portion of inferior margin (see fig. 12, c. pace). Pseudorostral lobes each with a small tooth at anterior end, meeting for a distance equal to one-sixth of length of carapace. Ocular lobe wider than long and with a pair of spines.

Pleon a little longer than cephalothorax, the sides of first to sixth somites with a few spines; the anterior five somites are indented on the sides, not smoothly

cylindrical; fifth somite one-fourth as long again as wide and not much longer than sixth, which is somewhat dilated posteriorly, where it is as broad as long; telson broadly subtriangular, two-thirds as long as sixth pleon somite, and with a pair of spines at the narrow apex; each side of telson, at about middle of length is produced as a tooth, immediately anterior to which is a bristle, and there are three pairs of lateral bristles, but no spines, in front of the terminal spines.

Third maxilliped with exopod about two-thirds as long as basis.

First peraeopod long, the carpus reaching a little beyond level of end of pseudorostrum; basis relatively short, much less than half as long as remainder of limb, with several teeth at distal end (including one at inner angle) and several

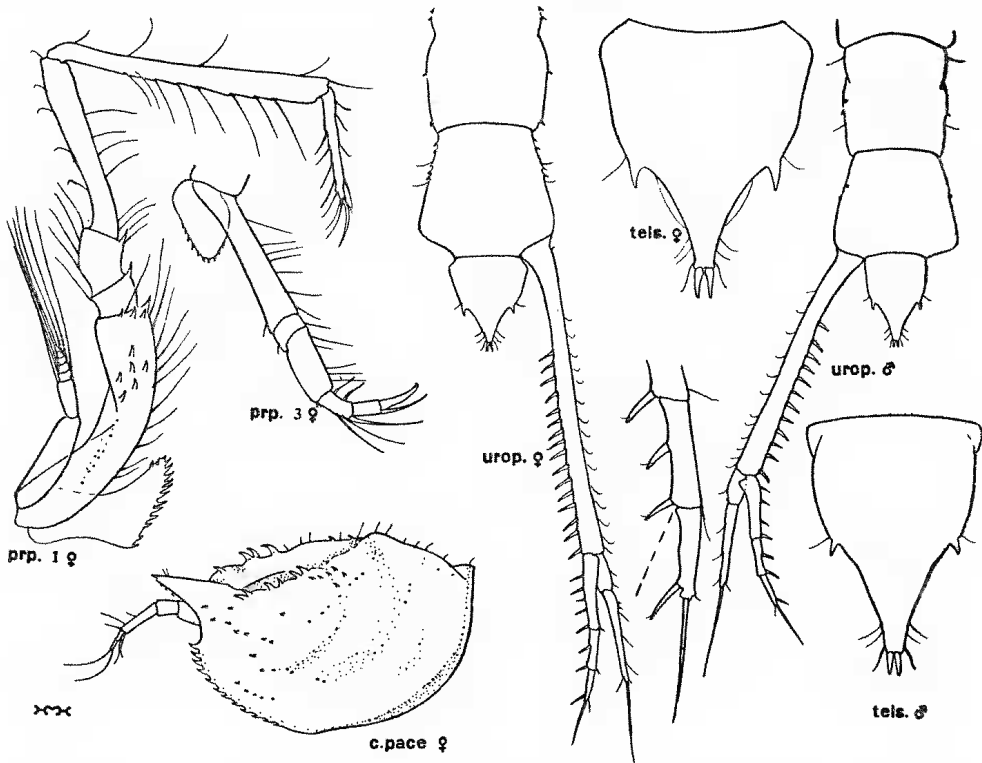


Fig. 12

*Dimorphostylis tasmanica*, type female and allotype male; c. pace, lateral view of carapace (x 21); prp., first and third peraeopods (x 32); urop., uropod with telson, etc. (x 32; distal joints of endopod, x 100); tels., telson (x 100).

on outer face; ischium and merus each with an inner apical tooth; propodus longer than combined lengths of ischium, merus and carpus, and two-and-one-half times as long as dactylus.

Second peraeopod without teeth on proximal joints; basis equal in length to remainder of limb and with a fringe of plumose setae on outer edge; ischium distinct; carpus twice as long as merus, nearly three times as long as propodus and a little longer than propodus and dactylus together; exopod longer than basis; edges of marsupial plate, like those of others, toothed.

Basis of third peraeopod about as long as rest of limb, that of fourth and fifth pairs relatively shorter; these posterior limbs are fairly stout; the merus is broader than in *inauspicata* and is longer than the carpus and propodus together; the propodal seta, like the longest of the three distal carpal setae, reaches to, but

not beyond, the tip of the stout dactylus, which is a little longer than either carpus or propodus; inner margin of carpus with two stout setae.

Uropod with peduncle distinctly longer than fifth and sixth pleon somites together and more than twice as long as endopod; its inner margin bears a row of sixteen spines in distal two-thirds of its length and its outer margin a row of fine, spaced setae; endopod with first joint little longer than second and third segments combined and with second nearly one-fourth as long again as third; inner spines of endopod four or five, plus two, plus one, and terminal spine about as long as second joint; exopod eight-ninths as long as endopod, with its slender terminal spine almost as long as its second joint.

Colour, creamy white. Length, 5.5 mm.

*Subadult male*—In general very like the female, and with similar armature, including the pair of spines on ocular lobe, the three median ones posterior to it, and the tooth at end of each pseudorostral lobe. A pair of small corneal lenses are discernible on ocular lobe. First legs as in female, with very long propodus.

The telson is relatively a little longer than in female but has the same lateral teeth, bristles and terminal spines (*cf.* tels. ♂ ♀, fig. 12).

Finally, the uropods are much as in the female, except that the peduncle is a little shorter in relation to the rami and has only 12 to 13 spines on inner edge, features which may be attributed to immaturity.

Length, 4.6 mm.

Loc.—Tasmania: off Babel Island, latitude 39° 55' S., longitude 148° 31' E. ("Warreen" Station 29, Jan. 1939). Types in S. Aust. Museum, Reg. No. C.2728.

#### DIMORPHOSTYLIS VIETA (Hale)

*Pachystylis vieta* Hale, 1936a, 424, fig. 14-15, and 1937, 72.

The species is available from St. Vincent and Spencer Gulfs, South Australia. The previously unknown adult male, described below, has the basis of the first to fourth peraeopods expanded, and in general agrees so closely with males of the other Australian species referred to *Dimorphostylis* that it can scarcely be separated generically. In one respect, however, the males show some discrepancy in that the pleopods are rather more rudimentary than is usual in the genus.

Most of the species placed in *Dimorphostylis* have oblique lateral ridges posterior to the level of hinder end of frontal lobe. In the female of *vieta* these are characteristically represented by series of low elevations, sometimes capped with setae. The curved antero-lateral fold (present in all species) is sometimes armed with a few spines, never so numerous as in *tribulis* and *tasmanica*. In the two last-named and in *inauspicata*, the distal carpal and propodal setae of the fossorial legs do not reach beyond the tip of the dactylus, as they do in the other Australian species excepting *D. vieta* which has these setae even shorter, and not reaching to end of dactylus.

The broad carapace and the proportions of second peraeopod and uropod provide other good distinguishing features for the species.

*Adult male*—Integument transparent, scarcely at all calcified, granulate on dorsal and dorso-lateral parts of carapace.

Carapace less than two-fifths of total length, nearly twice as long as deep, and about one-fourth as wide again as deep; there are three ill-defined longitudinal folds on each side (see fig. 13) and a pair of faint, irregular, longitudinal ridges on back, margining a slightly concave median area. Antero-lateral margin oblique, scarcely concave, and antero-lateral angle rounded, with two denticles.



Pseudorostrum subacute anteriorly, both as seen from above and from side, rather wide basally and with the lobes meeting for a distance equal to fully one-sixth of total length of carapace. Ocular lobe large, twice as wide as long and with three prominent, tumid, pale lenses, with granular structure.

Pedigerous somites together only half as long as carapace; pleural parts not much expanded in any, but those of first concealed by second.

Pleon not much shorter than cephalothorax; fifth somite little longer than sixth, which is somewhat widened posteriorly, where it is almost as broad as long; telson larger than in female, three-fourths as long as sixth pleon somite, sub-cylindrical for greater part of length then tapering suddenly to the narrow apex; there is an extremely short post-anal part, with a pair of short terminal spines

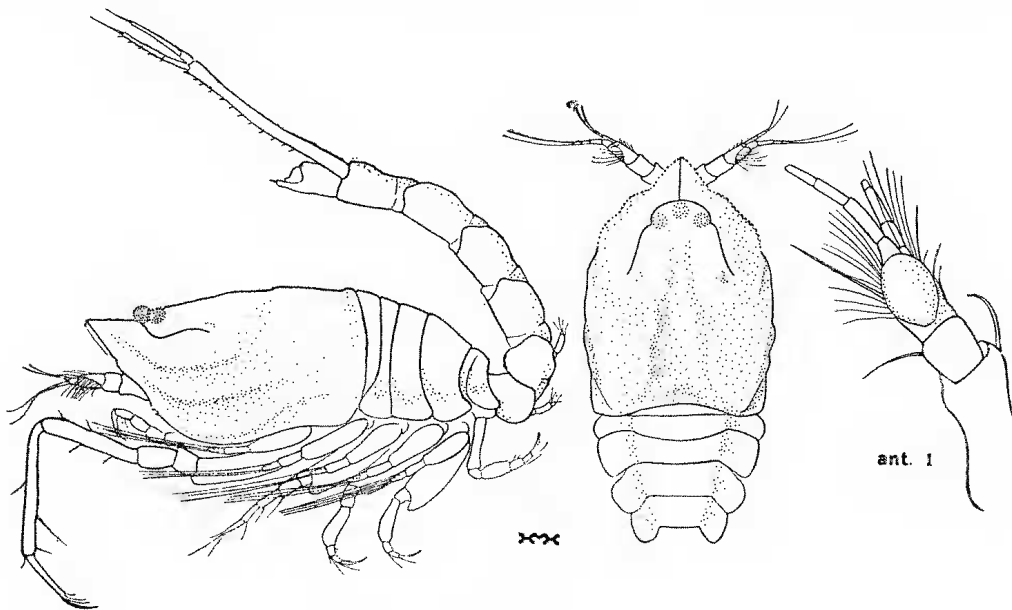


Fig. 13

*Dimorphostylis vieta*, adult male; lateral view and cephalothorax from above (x 30); ant. 1, ventral aspect of first antenna, the terminal appendages of flagella omitted (x 80).

flanked by a bristle on each side (these spines are sometimes longer in the female than is shown for the type, but are always small).

First antenna with basal segment not quite as long as second and third joints together; the third peduncular joint is half as long again as second and bears a stout seta, and a rather dense fringe of hairs around an oval ventral area; flagellum four-jointed, as long as the two distal segments of peduncle combined; accessory lash four-jointed (the last segment tiny) and relatively long, being equal in length to last peduncular joint.

Second antenna with flagellum long, reaching to end of pleon and with very elongate joints; it is furnished with minute spinules but no dense fringe of hairs.

Mandible with 10 or 11 spines in the row.

Third maxilliped with basis half as long again as rest of limb, its external angle not forwardly produced and with the usual fringe of stout and long plumose setae.

First pereopod stout and long, the merus reaching beyond level of antennal angle, and carpus beyond that of pseudorostrum; basis half as long as rest of limb

with two of the plumose setae distal and long; propodus a little longer than carpus, twice as long as ischium and merus together, and more than twice as long as dactylus, the terminal seta of which is stout and claw-like.

Basis of second peraeopod (like that of third and fourth) produced distally; it is half as long again as remainder of limb; ischium distinct; carpus a little longer than either merus or propodus and subequal in length to dactylus.

Remaining peraeopods rather robust, with basis longer than rest of limb in third and fourth, shorter in fifth; merus of third and fourth not much shorter than carpus, propodus and dactylus together; longest distal carpal seta not nearly attaining, and propodal seta reaching, level of tip of dactylus.

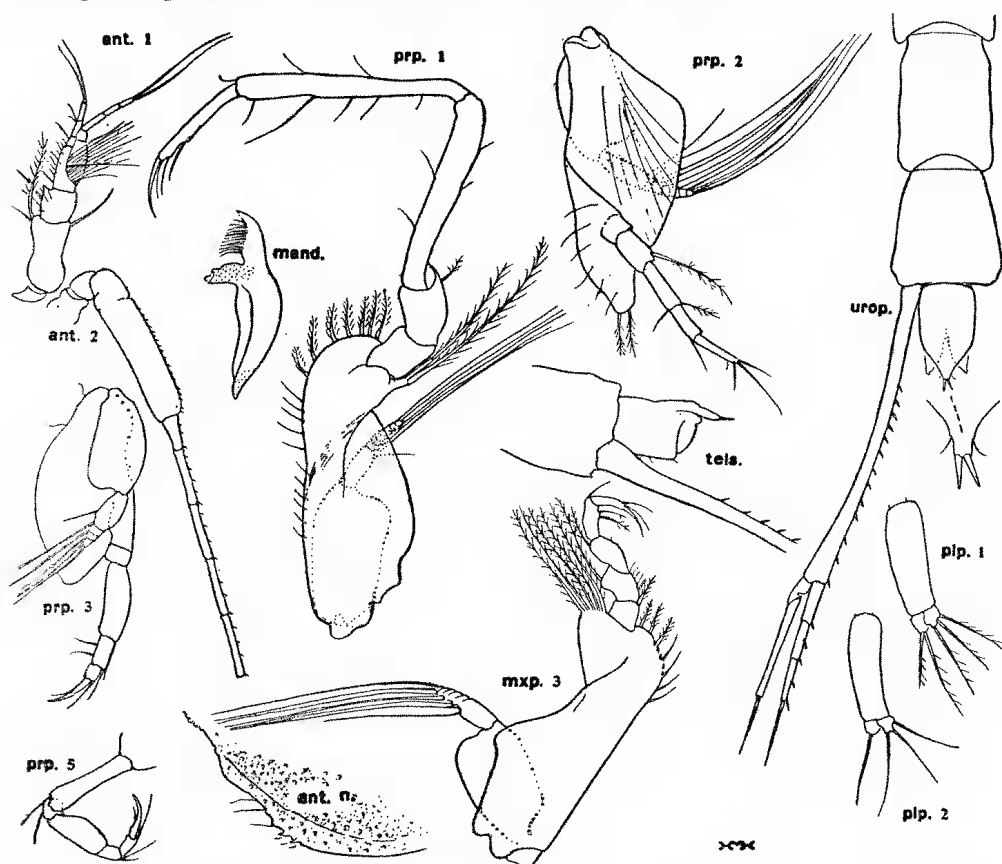


Fig. 14

*Dimorphostylis vieta*, adult male; ant. n., antero-lateral margin and angle; ant. 1, first antenna and upper lip; ant. 2, second antenna, only the proximal joints of flagellum shown; mand., mandible; mxp. and prp., third maxilliped and peraeopods; urop., uropod with fifth to sixth pleon somites and telson; tels., lateral view of telson (all x 50); plp., pleopods (x 120).

Each of the two pairs of pleopods are biramous, both rami single-jointed; the setae are sparse (see fig. 14, plp. 1-2).

Peduncle of uropod very long and slender, almost equal in length to fifth and sixth pleon somites and telson combined; the distal three-fourths of the inner edge bears a row of a dozen or so short spines; exopod and endopod subequal in length, each with a terminal spine about half as long as the rami; endopod divided into three segments, the first and third subequal in length, the second a little shorter; inner margin with one, two and two spines respectively.

Length, 3.3 mm.

Secured in Spencer and St. Vincent Gulfs, South Australia, at night, by townet or submarine light.

Zimmer (1921, 148) considers that *Dimorphostylis* may be closely related to *Pachystylis* (Hansen, 1895, 58). The recent examination of a score of species referable to *Gynodiastylis* leaves one with the impression that the affinities of *Pachystylis rotundata* lie more with that genus (see also Zimmer, 1914, 192) than with *Dimorphostylis*. Fuller information regarding Hansen's Brazilian species must be awaited.

***Dimorphostylis colefaxi* sp. nov.**

*Female with developing marsupium*—Integument lightly calcified, tough but not brittle.

Carapace less than one-third of total length of animal and not much longer than pedigerous somites together; it is more than half as long again as deep and is as wide as deep; seen from above the sides are subparallel in proximal half; on

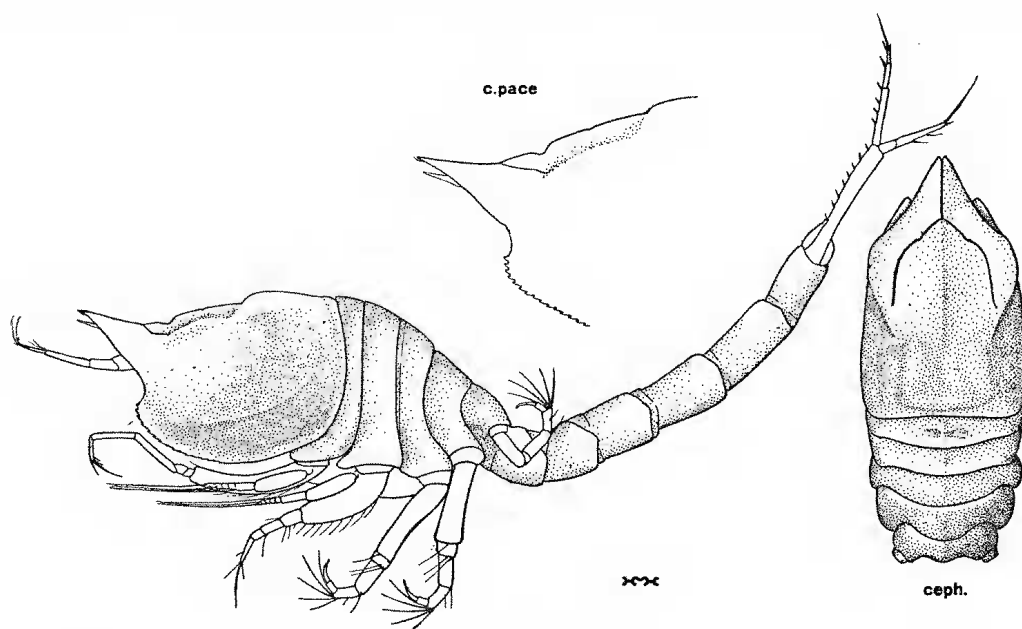


Fig. 15

*Dimorphostylis colefaxi*, type female; lateral view and (ceph.) cephalothorax from above (x24); c, pace, anterior portion of carapace (x36).

each side a dorso-lateral fold curves back from pseudorostrum around frontal lobe to beyond middle of length; as in other Cumacea with similar sculpture these elevations are most conspicuous when the animal is viewed from above; the dorsal space between the folds is somewhat flattened, but rises to a low ridge medianly; in posterior third of length of carapace the dorsum is slightly excavate and on each side this hollow is emphasised by a low fold; below dorso-lateral ridge there is on each side a shallow concavity beneath which, and subparallel to inferior margin, is a faint, curved carina, above which the surface is faintly pitted, resulting in an obscurely reticulated appearance; seen from the side the pseudorostrum is acutely pointed in front and the dorsal contour is irregular because of the folds alongside the dorsal concavity and a couple of slight incisions in the median ridge of anterior half (fig. 15, c. pace).

Pedigerous somites not differing much in length; with pleural parts expanded but not conspicuously so; second and third legs separated by a wider interspace than third and fourth, but even so by no means well separated.

Pleon shorter than cephalothorax, the somites successively increasing in length to fifth; sixth less than two-thirds as long as fifth, dilated posteriorly, where it is distinctly wider than long; telson cordate, less than three-fourths as long as sixth somite, with a very abbreviated post-anal portion and a pair of slender terminal spines flanked on each side by a bristle.

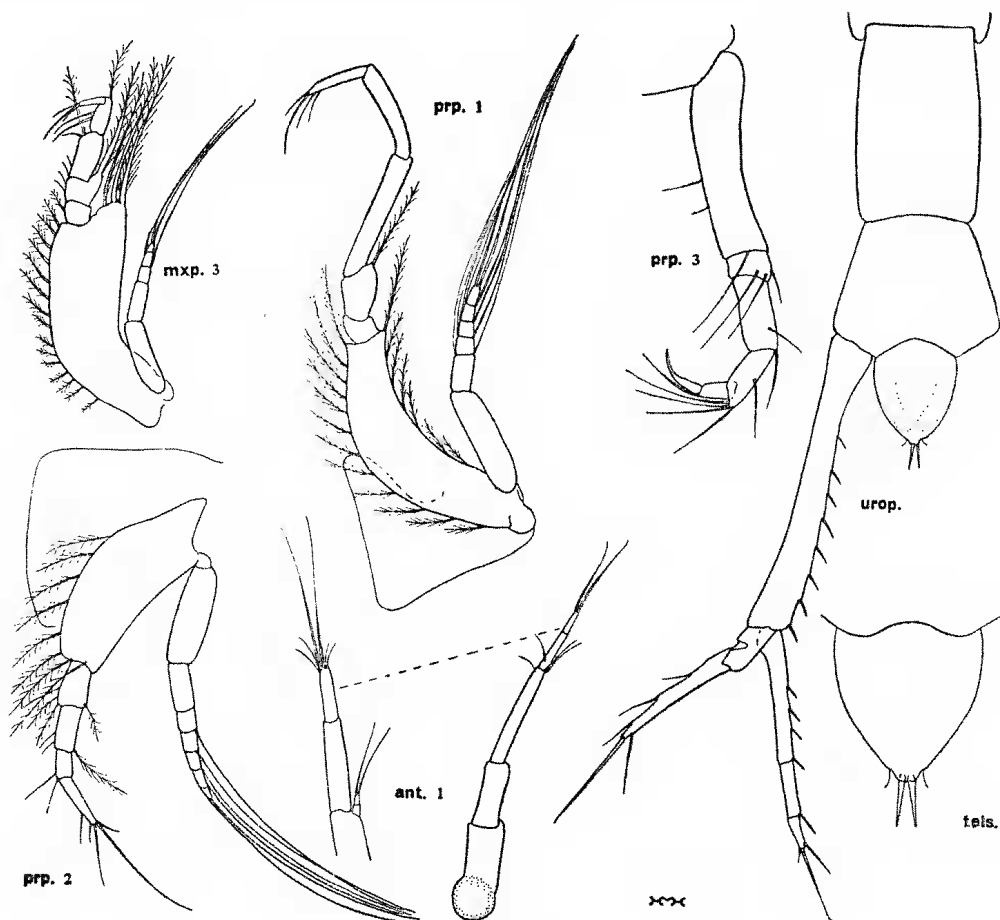


Fig. 16

*Dimorphostylis calefaxi*, type female; ant., first antenna ( $\times 56$ ; flagella,  $\times 126$ ); mxp. and prp., third maxilliped and peraeopods ( $\times 56$ ); urop., ventral view of uropod, fifth to sixth pleon somites and telson ( $\times 56$ ); tels., dorsal view of telson ( $\times 85$ ).

First antenna slender and rather long; third joint of peduncle fully as long as first, and half as long again as second; flagellum stout, composed of two joints, the first of which is two-thirds as long again as second; accessory flagellum insignificant, two-jointed.

The second antenna has the plumose setae thickly clogged with sediment and the joints cannot be made out.

Third maxilliped with exopod well developed; basis large, one-third as long again as rest of limb and with outer apical part a little produced forwards; carpus

longer than any other of the remaining joints and almost twice as long as the rather small dactylus.

First peraeopod small, reaching when extended barely beyond level of front of pseudorostrum and with the carpus reaching antennal angle; basis shorter than rest of limb, with plumose setae on both margins; carpus more than twice as long as merus (which bears an outer distal plumose seta) and one-third as long again as propodus, which is more than half as long again as dactylus.

Second peraeopod with the stout basis shorter than the exopod but considerably longer than rest of limb; ischium suppressed; merus and carpus subequal in length, each half as long again as propodus, which is not much more than half length of dactylus; one of the terminal dactylar setae is slender, and is as long as the three distal joints together.

Third and fourth peraeopods stout, the basis little shorter than remaining joints together; carpus almost as long as merus, and with four distal setae, the longest, like propodal seta, reaching well beyond tip of dactylus.

Peduncle of uropod narrow, almost as long as fifth and sixth pleon somites together and armed on inner margin with a row of nine spaced spines; endopod one-fourth as long again as exopod and a little less than three-fourths as long as peduncle; it is three-jointed, with the first joint two-and-one-half times as long as second, which is two-thirds as long again as the distal joint; inner spines four, one and one, and longer terminal spine less than half as long as the ramus; exopod with three setae on outer margin and one (subdistal) on inner; distal spine more than half as long as the ramus.

Colour, creamy-yellow. Length, 4.2 mm.

*Loc.*—New South Wales: Lake Illawarra (A. N. Colefax, June 1937) Type in S. Aust. Museum, Reg. No. C.2683.

It should be noted that Lake Illawarra, like the Noosa River in Queensland, is an inlet of the sea. The species is named after its collector, Mr. A. N. Colefax, Lecturer in Zoology of the University of Sydney.

#### DIMORPHOSTYLIS COTTONI Hale

*Dimorphostylis cottoni* Hale, 1936, 400, fig. 5-6 (male only).

Material now referred to this species is available from more than a score of localities off South Australia, Tasmania and New South Wales (long. 136° to 152°; lat. 32° to 40°). Adult males far outnumber ovigerous females in the hundreds of specimens taken by submarine light, Agassiz trawl, and townet.

The carinae of the carapace of some New South Wales examples are much more distinct than in material from South Australia, and also appear to be more markedly crenulate. These ridges are also somewhat variable in disposition; the one immediately behind the frontal lobe may run completely across the back and in some specimens, both male and female, and from both South Australia and New South Wales, there is an additional lateral ridge towards the rear of the carapace (x in fig. 17, ceph.).

The size is variable, both adult males and ovigerous females, ranging from barely more than 4 mm. to over 7 mm. in length. The telson of the female has usually two pairs of lateral spines, but sometimes three are present on one or both sides, and occasionally only one pair is developed. In the male the position is different. Young examples and small adults (5 mm. or so in length) have the telsonic spines as in the female, but in the larger mature males (6 mm. to 7 mm.) lateral spines are completely absent. The average size of adults taken in sheltered waters (such as in the closed bay of Port Lincoln in South Australia) is smaller

than that of those from more open seas, and it is amongst the latter, from both southern and eastern coasts, that the males without lateral telsonic spines are found; in these last the flagellum of the second antenna reaches to the end of the rami of the uropods.

The U-shaped ridge enclosing the depression in the dorsum of the male telson is well developed, and is just as in *Paradiastylis longipes* (Calman, 1905, 21, fig. 4). The armature of the uropods of the adults of this sex is variable, the spines being usually a trifle more numerous in the aforementioned large males than they are in the type and in examples of similar size to this. The peduncle has on inner edge 12 to 18 spines, the joints of the endopod 12 to 16, plus one to three, plus one or two. The pleopods have the exopods two-jointed, the second segment very short (fig. 18, plp.).

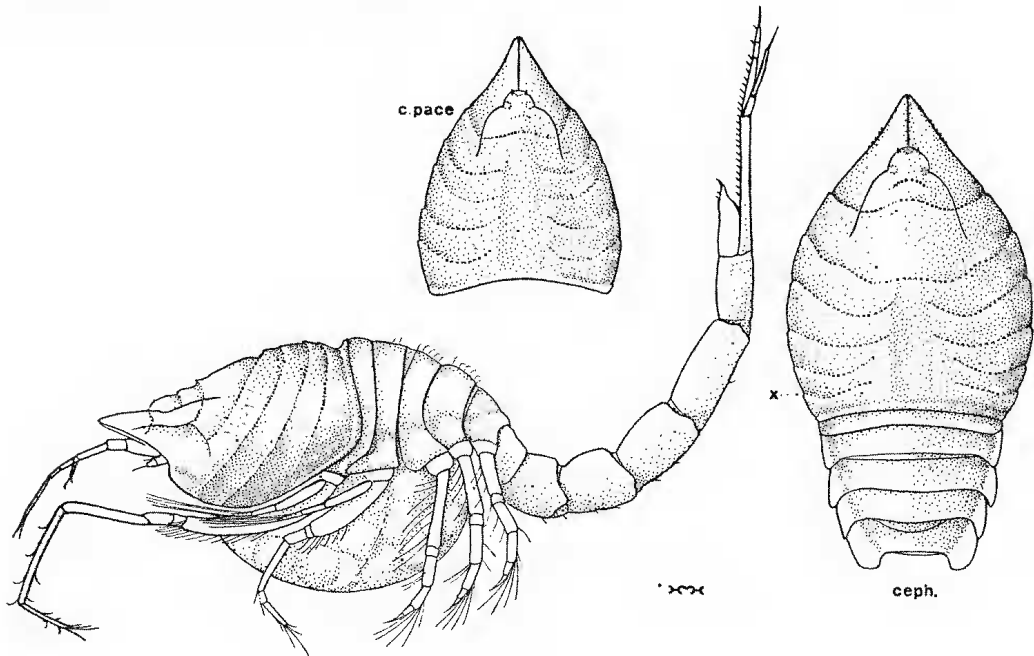


Fig. 17

*Dimorphostylis cottoni*; lateral view of 4.2 mm. ovigerous female and (c. pace) carapace from above; ceph., cephalothorax of subadult 5 mm. female (all  $\times 25$ ).

The type is described as having a single corneal lens on the ocular lobe; examination of further material shows that three lenses are present in both sexes, but in most preserved specimens they are extremely difficult to see. Material in alcohol is semi-transparent, but Mr. Sheard notes that some examples he collected in South Australia in 1941 were bright orange in colour during life. Some specimens recently found amongst plankton collected in St. Vincent Gulf by the writer, and preserved for a few hours in formalin, and then for a short time in alcohol, had red eyes, a few red spots on the sides of third and fourth pedigerous somites and a red spot on each side of the fifth pleon somite; the general body colour was yellow.

*Ovigerous female*.—Integument membranous. Carapace a little less than one-third of total length of animal, nearly half as long again as pedigerous somites together, distinctly wider than deep and three-fourths as long again as deep. Antero-lateral margin scarcely concave, antero-lateral angle rounded, and inferior margin very finely serrate. Pseudorostrum narrow, subacute in front when viewed from above or from the side, the lobes meeting for a distance equal to

from one-fifth to one-sixth of length of carapace. Ocular lobe much wider than long, armed with a pair of denticles in front.

Pedigerous somites not much expanded on sides; fourth and fifth a little longer than the others.

Pleon, as in male, distinctly longer than cephalothorax; fifth somite sub-cylindrical, twice as long as wide and one-third as long again as sixth, which is not very greatly dilated posteriorly, where it is about four-fifths as wide as long; telson not quite as long as sixth somite.

First antenna without the brush of sensory setae present in the male; first joint of peduncle nearly twice as long as second and about equal in length to the

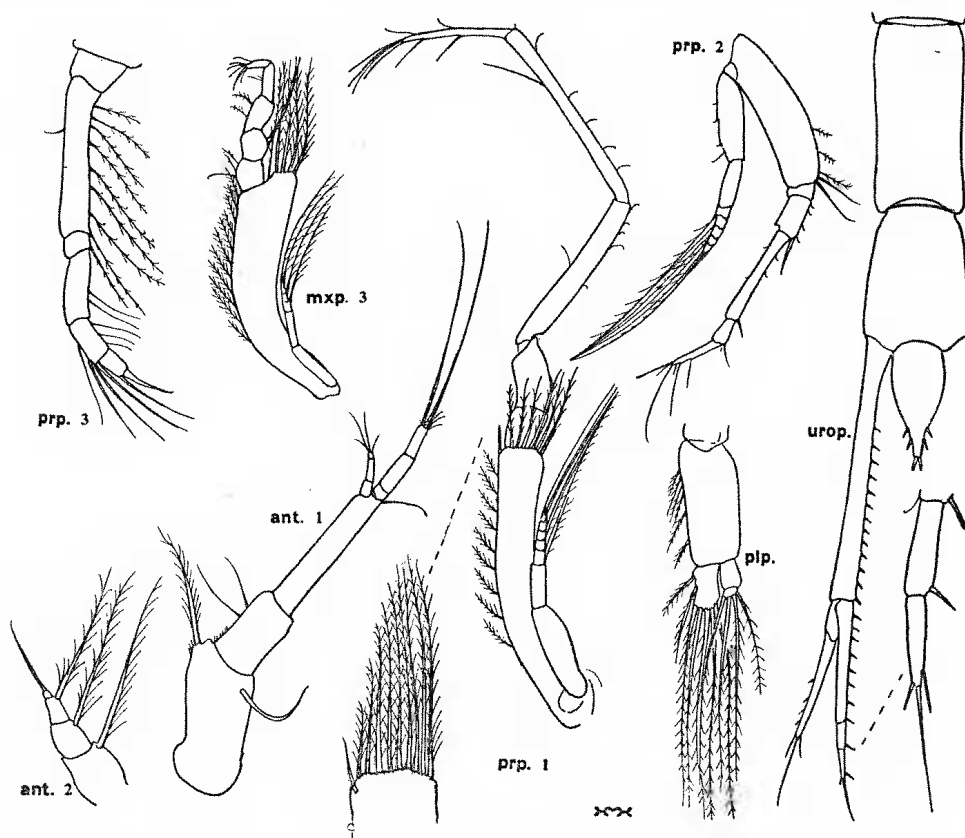


Fig. 18

*Dimorphostylis cottoni*, ovigerous female; ant., first and second antennae (x86); mxp. and prp., third maxillipeds and peraeopods (x43; distal end of basis of first peraeopod, x86); urop., uropod with fifth to sixth pleon somites and telson (x43; distal joints of endopod, x172). plp., Pleopod of male (x86).

slender third segment; flagellum as long as second peduncular segment and composed of three joints, the first short, the other two subequal in length; accessory lash three-jointed, about half as long as main flagellum, and with distal segment small. Second antenna with first joint longer than second, which is longer than third, and with fourth and last very small; first three segments each with a plumose seta, terminal one capped with a plain seta.

Branchial lobes digitiform and, as in male, about seven in number, the posterior ones small.

Third maxilliped with exopod only about half as long as basis, which is half as long again as combined lengths of remaining joints, which do not differ much in length save that the dactylus is distinctly shorter than propodus.

First peraeopod with carpus reaching well beyond level of anterior end of pseudorostrum; basis half as long as remainder of limb, its distal end with a series of graded plumose setae; propodus only about one-fifth as long again as carpus and twice as long as dactylus.

Second peraeopod less than half as long as first; basis two-thirds as long as rest of limb; ischium distinct; carpus more than twice as long as merus, four times as long as propodus, and not quite twice as long as dactylus.

Second and third peraeopods separated more widely than any of the others. Third to fifth with basis distinctly shorter than rest of limb, with merus as long as carpus and propodus together, and with dactylus long and slender; the distal carpal setae, like the propodal seta, reach well beyond end of dactylus.

Peduncle of uropod more than twice as long as telson and half as long again as endopod, which is one fourth as long again as exopod; it has about a dozen spines on inner margin, first segment of endopod fully twice as long as combined lengths of the subequal second and third joints; spines of inner margins of endopod joints usually about ten plus one plus one.

Fig. 17 gives the lateral view and carapace of a female 4.2 mm. in length (Port Lincoln, South Australia), and the cephalothorax of a larger subadult female from New South Wales. The largest ovigerous female is 7.1 mm. in length, and its ova are 0.23 mm. in diameter.

#### *Dimorphostylis tribulis* sp. nov.

*Ovigerous female*—Integument thin but considerably calcified; surface, except for carinae and spines as described, almost smooth, dull and not at all polished. Sparsely clothed with short plumose hairs which tend to collect algal debris, forming a coating concealing the surface sculpture.

Carapace plump, wider than deep and little more than half as long again as deep; it is almost twice as long as pedigerous somites together, and less than one-third of total length of animal; seen both from above and from the side it is sub-oval and tapering towards the front in anterior fourth of length; the antero-lateral fold is armed with an irregular row of spines and the dorsum on and behind frontal lobe bears a few spines, one more prominent than the others; posterior to frontal lobe each side has three curved carinae, the first of which is spinose and is joined near lower edge of carapace by the second, the short connecting part also spinose. Antero-lateral margin quite deeply concave for the genus; inferior margin strongly serrate, the most anterior of the teeth emphasising the antero-lateral angle; pseudorostral lobes meeting for a distance equal to one-sixth of length of carapace; each terminates dorsally in a small tooth, and seen from the side has the anterior end narrowly subtruncate. Ocular lobe wider than long, denticulate.

Pedigerous somites successively increasing in dorsal length to fourth, and fifth a little longer than third; third somite expanded fore and aft, but second and third peraeopods no more widely separated than the others.

Pleon stout, longer than cephalothorax, with a few scattered spines on sides, which in the first to fifth somites are uneven, not smoothly cylindrical; fifth somite not conspicuously longer than sixth, which is scarcely dilated posteriorly, where it is as wide as long; telson shorter than sixth somite, subtriangular, with sides entire but sinuate; post-anal part short, armed with a single terminal spine and two pairs of lateral spines, anterior to which are two widely spaced pairs of setae.



Mandible with 12 to 13 spines.

First joint of peduncle of first antenna stout, one-third as long again as third, and two-and-one-half times as long as second; it is armed with a small distal tooth and has the usual large plain seta and distal plumose seta; flagellum half as long as first peduncular segment, three-jointed, the first joint the longest and the second shorter than third; accessory lash half as long as main flagellum and three-jointed, the proximal and distal segments short. Second antenna with terminal joint very small and capped with a plain seta; first to third segments with the usual plumose setae.

Third maxilliped as in *inauspicata*, with exopod about three-fourths as long as basis.

First pereopod long, the carpus reaching to level of apex of pseudorostrum; basis short, much less than half as long as remaining joints together, with a small

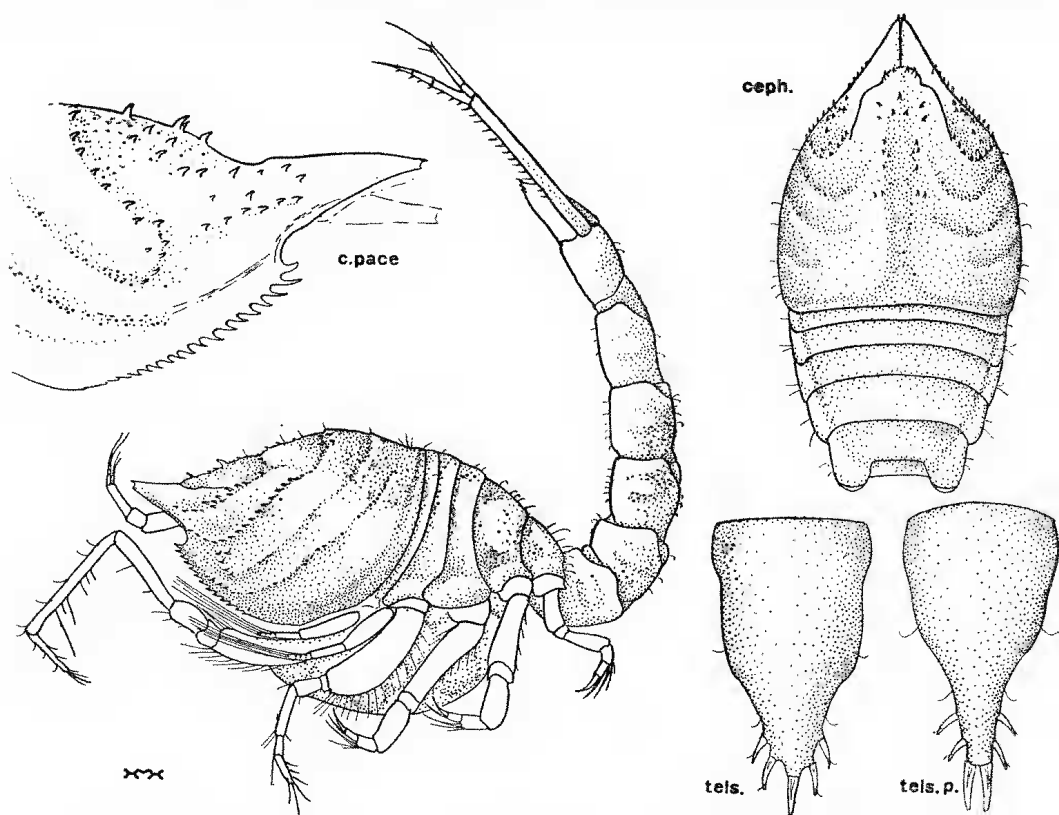


Fig 19

*Dimorphostylis tribulis*, type female; lateral view and (ceph.) cephalothorax from above (x22); c. pace, anterior part of carapace, with frontal lobe removed (x44); tels., telson (x88); tels. p., telson of paratype ovigerous female (x88).

tooth at inner distal angle and a dense distal brush of plumose setae; ischium with a tooth at inner apical angle; propodus equal to combined lengths of merus and carpus, twice as long as propodus and little shorter than basis.

Second pereopod with basis unarmed but with fine and dense plumose setae on inner margin; it is not quite as long as remaining joints together; ischium distinct; carpus elongate, almost twice as long as merus, and two-and-one-half times as long as propodus, which is two-thirds as long as dactylus; setae of last-named slender, the longest terminal ones much exceeding the joint in length.

Third to fifth peraeopods robust; basis not quite as long as rest of limb in third pair, relatively shorter in the others; merus a little longer than carpus and propodus together; propodal seta and longest of the three distal carpal setae not reaching beyond tip of the stout claw-like dactylus; on its inner margin the carpus has two stout setae, which are longer in fourth and fifth peraeopods than they are in the third pair.

Peduncle of uropod not quite as long as fifth and sixth pleon somites and telson together, twice as long as endopod and with 14 spines on inner margin; endopod with first joint nearly one-third as long again as second and third segments together; second more than one-third as long again as third; spines on inner margin number four plus two plus one, and the slender terminal spine is

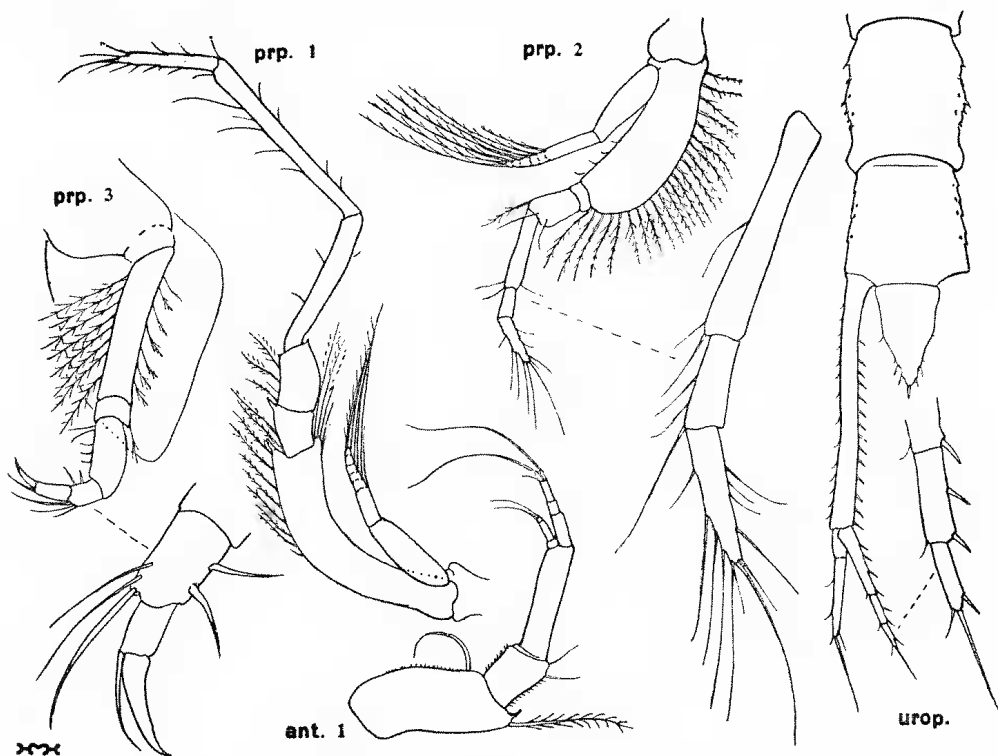


Fig. 20

*Dimorphostylis tribulis*, type ovigerous female; ant., first antenna (x70); prp., first to third peraeopods (x38; distal joints, x100); urop., uropod with fifth to sixth pleon somites and telson (x38; distal joints of endopod, x100).

longer than second joint; exopod a little longer than first two segments of endopod together, with terminal spine as long as its second joint.

Colour, creamy-white. Length, 5 mm.

*Loc.*—South Australia: Kangaroo Island, Antechamber Bay, dredged in daylight, 7 fms. and submarine light, surface at night with tide running strongly (K. Sheard, April 1941). Type ovigerous female in S. Aust. Museum, Reg. No. C.2800.

The telson of the type female is not perfectly symmetrical and should be regarded as abnormal in regards to terminal armature; the usual condition is as in the telson of the ovigerous female shown in fig. 19, tels. p.

This species is easily separated from the other two occurring in South Australia. The conspicuously stouter third to fifth peraeopods and the lesser number

of lateral carinae of the carapace at once distinguish it from *cottoni*, and it may be added that the last-named characteristically has a clean integument but *tribulis*, at least in the case of the ovigerous female, is coated with flocculent material. In some respects *tribulis* resembles *vieta* more closely, particularly when the latter has a few spines on the antero-lateral fold; apart from size there are, however, many small points of difference. The character most readily checked is found in the endopod of the uropod of *vieta*, where the three segments do not differ much in length, a feature not found in any other species of the genus.

*D. tribulis* is close to *tasmanica*, which, however, has (1) no well-marked carinae on sides of carapace posterior to the antero-lateral fold; (2) a small tooth on each side margin of the telson, which lacks articulated lateral spines in both sexes; (3) the first peraeopod longer and of different proportions.

#### Genus *Anchistylis* nov.

Generally resembling *Colurostylis* (Calman, 1911, 376) but with the pleopods of the male much modified. In each of the two pairs there is only one unjointed ramus. The ramus of the first bears a pair of strong hook-like setae, that of the second three non-plumose setae of different type. The endopod of the uropod is three-jointed in both sexes. The second antenna of the female is four-jointed, the last segment tiny, the penultimate large. That of the male has the flagellum composed of very long, slender joints, and reaching to or beyond end of pleon.

The basis in the first to fourth peraeopods of the male is expanded as in *Paradiastylis* and *Dimorphostylis*, but less markedly; it is produced well beyond the articulation of the ischium.

Genotype *Anchicolurus waitei* Hale.

Zimmer (1930, 651) places *A. waitei* in *Colurostylis*, evidently not regarding Stebbing's *Anchicolurus* as separable from Calman's genus. In view of the variation which occurs in *Gynodiastylis*, the number of joints of the endopod is not alone very important and the relative lengths of propodus and dactylus of the second leg can scarcely be regarded as of generic value. Calman, however (1912, 670-674) mentions other noteworthy characters wherein his Californian *Colurostylis* (?) *occidentalis* (later the type of *Anchicolurus*—Stebbing, 1912, 176, and 1913, 130) does not conform with the two New Zealand species which he admits, viz., the genotype, *pseudocuma*, and *lemurum* (Calman, 1911, 376, pl. xxxvi, fig. 23-26, and 1917, 153, fig. 7-8).

*A. waitei* agrees with Calman's genus in the form of the telson; this is rounded, subcordate and without armature or postanal portion in the female, but in the male with a distinct post-anal part bearing a pair of very slender spines, or bristles, set a little below the actual tip (see fig. 21, tels.). There is also marked sexual difference in armature in *Allodiastylis* (Hale 1936a, 72), etc.

Calman refers to the very small size of the telson of his forms; the relative length of this somite varies greatly in the three species here referred to *Anchistylis* and, indeed, exhibits some variation within the limits of one species.

The integument is semi-transparent with little or no calcification.

#### KEY TO SPECIES OF ANCHISTYLIS

- 1 Second joint of endopod of uropod at least half as long again as third. 2  
*waitei* (Hale)  
 Second joint of endopod of uropod not longer than third. ....
- 2 Adult female. Telson small, one-half as long as sixth pleon somite or less. First peraeopod with basis as long as remaining joints together. .... *similis* sp. nov.  
 Adult female. Telson large, more than three-fourths as long as sixth pleon somite. First peraeopod with basis much shorter than remaining joints together. .... *longipes* sp. nov.

## ANCHISTYLIS WAITEI (Hale)

*Anchicolurus waitei* Hale, 1928, 45, fig. 15-16, and 1936, 418.

*Colurostylis waitei* Zimmer, 1930, 651.

A good number of specimens are now available from the southern coasts of Australia.

The posterior margin of the antero-lateral depression of the carapace is finely serrate, as is also the curved dorso-lateral ridge; the antero-lateral angle is produced as an acute tooth in both sexes and the margin behind it is feebly serrate.

The telson varies in length. In the female type, taken on the south-eastern coast of South Australia, it is about two-thirds as long as the peduncle of the uropod, but in females from St. Vincent and Spencer Gulfs and from Victoria it is shorter, only half as long as the peduncle (bottom right in fig. 24). Spines at distal end of male telson about one-third as long as telson.

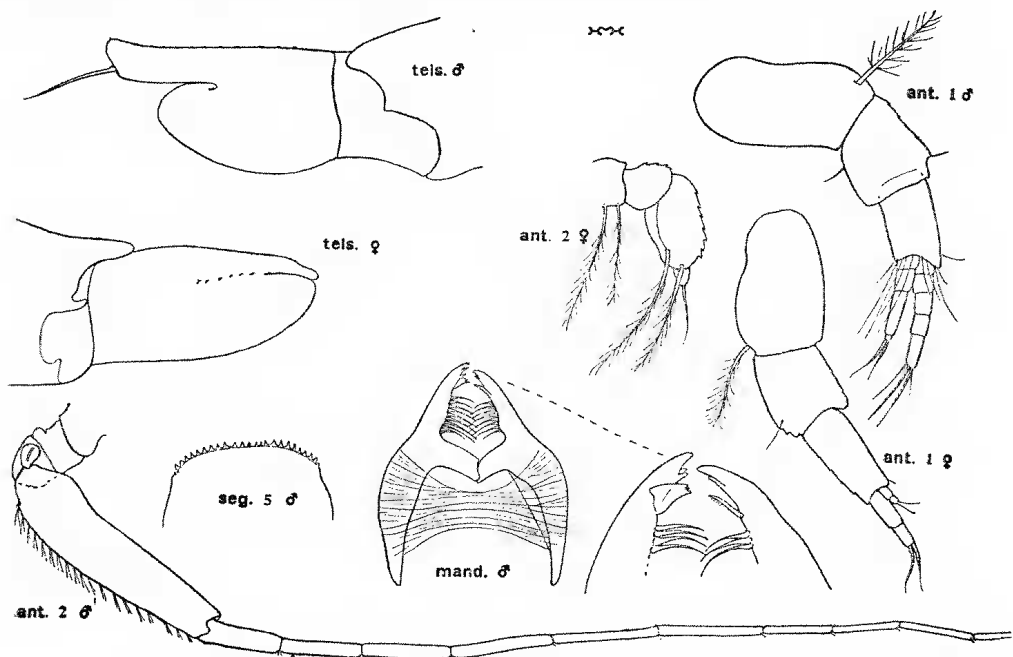


Fig. 21

*Anchistylis waitei*, ovigerous female and adult male; ant. 1 ♂ and ant. 1-2 ♀, first and second antennae (x 120); ant 2 ♂, second antenna (x 55, only proximal part of flagellum shown); mand., mandibles (x 55, distal portions, x 120); tels., lateral views of telson (x 120); seg. 5, anterior edge of fifth pedigerous somite (x 55).

Mandible with eight to nine spines in the row.

The external distal angle of basis of third maxilliped is forwardly produced, reaching just beyond level of distal margin of ischium in the female, and much beyond this in the male; in the female the basis of this appendage is almost twice as long as the remaining joints together, and fully half as long again as exopod.

Basis of second peraeopod less than two-thirds as long as rest of limb in adult female.

Uropod with peduncle subequal in length to rami in female, a little longer in male; second joint of endopod about half as long again as third in both sexes.

The pair of strong, hook-like setae on the ramus of the first pleopods are about as long as the peduncle and curve outwards and forwards; their tips bear

a few tiny plumes; no other large setae are present on this appendage, but there is a pair of plumose setae near their base.

Ramus of second pleopod with three unequal composite setae; one of these, seated at distal end, is stout and apically bifid, one on anterior edge (lower edge when the pleopod lies along venter of somite in normal position) is long and more slender, while another, also moderately stout, is situated on the upper or posterior edge. At the base of ramus the outer distal angle of peduncle bears a bifid seta like that of apex of ramus.

The function of these curious pleopods is apparent in some of the many males preserved in alcohol. When in a resting position the long lash of the second antenna lies beneath the sides of the carapace and pleural parts of the first four pedigerous somites, then against the underside of the pleon, in much the same way as in some other Diastylids where this appendage is long. It emerges at the rear of the fourth pedigerous somite, thence passes outside the basis of the fifth peraeopod, and beneath three stout plumose setae on the prominent postero-lateral rounded portions of the fifth pedigerous somite (fig. 22). It is then held down by the hooks of the first pleopod, the tension producing a sharp bend, at an

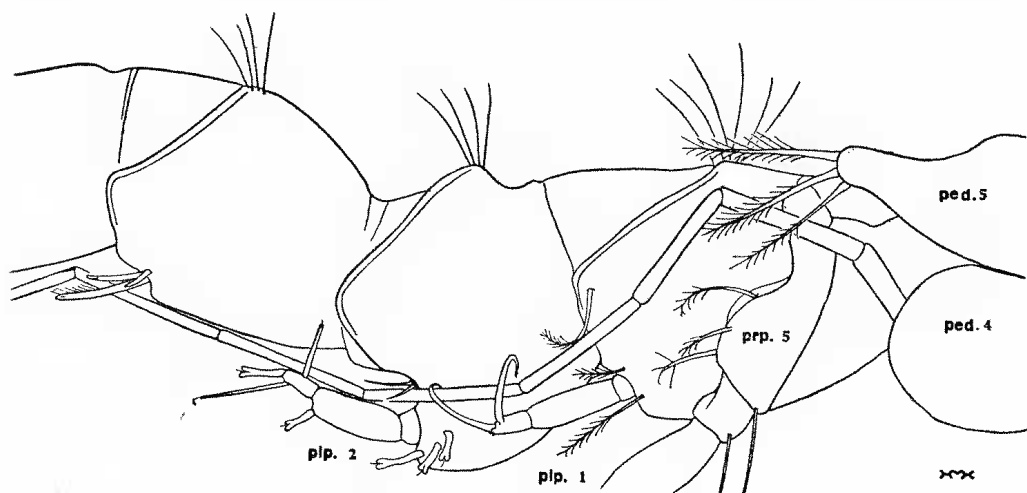


Fig. 22

*Anchistylis waitei*; first three pleon somites, etc., showing the anchoring of flagellum of second antenna by pleopods ( $\times 120$ ). ped 4-5, Posterior parts of fourth and fifth pedigerous somites; prp. 5, fifth peraeopod; plp. 1 and 2, pleopods.

articulation, immediately behind the thorax, and another less pronounced at the end of the joint actually caught by the hooks; this joint, incidentally, may be very slightly curved by the tension.

The second pleon somite is much produced ventrally, particularly posteriorly; seen from below the protuberance is cordate and tapers to the rear, where are seated on each side a group of thick setae with bifid apices, and some distance above these a pair of stiff, pointed setae. The flagellum is held against the concave sides of this prominence by the first pleopods, passing between the two groups of setae, and is thus guided in towards the mid-line of the venter, passing the second pleopods. The upper seta of the ramus of the last-named apparently serves as a lateral guide to the lash, while in some examples the lower seta crosses its fellow of the opposite pleopod below the flagella. Beyond the second somite the two flagella lie side by side in the ventral gutter of the pleon. The third to fifth somites each bear, near posterior end, two groups (one on each side of the channel) of three unequal rod-like setae, the longest of which is furnished with

plumes directed inwards; these setae possibly assist to retain the lashes in the ventral groove.

***Anchistylis similis* sp. nov.**

*Ovigerous female*—Carapace much as in *waitei* but with antero-lateral angle rounded, feebly dentate and without prominent tooth; a depression at antennal border margined posteriorly by a ridge which is met by the very feebly serrate dorso-lateral ridge; on dorsum the area between the ridges is slightly excavate, with a low tumidity on each side of the hollow. Ocular lobe wide, with eyes ill-defined, but discernible as three areas more opaque than surrounding chitin.

Pedigerous somites as in *waitei* but anterior margin of fifth somite with smaller serrations.

Telson half as long as sixth pleon somite and not much more than one-third as long as peduncle of uropod.

Second antenna as in *waitei* (fig. 21) but first pair with accessory flagellum a little longer.

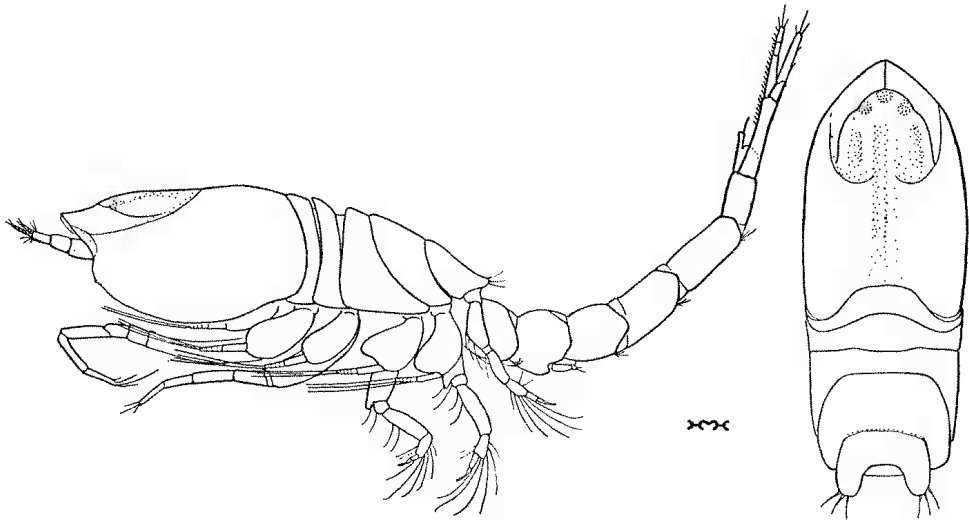


Fig. 23

*Anchistylis similis*, paratype male; lateral view and cephalothorax from above (x 23).

Mandibles with 10 and 11 spines in the row, the last two or three short and slender.

Nine digitiform branchial lobes, one reflexed, the last two very small.

Basis of third maxilliped much less than half as long again as remaining joints together and not much longer than exopod; with external apical angle not produced beyond level of distal margin of ischium.

First peraeopod as in *waitei*, with the basis as long as or a little longer than rest of limb.

Second peraeopod with basis as long as remainder of limb without the dactylus; ischium distinct; merus, propodus and dactylus subequal in length, carpus a trifle longer.

Peduncle of uropod about as long as the subequal rami; first joint of endopod more than twice as long as second, which is not quite as long as third; inner margin with a few spines near distal end, the rest of this edge with fine setae.

Length, 3.5 mm.

*Adult male*—Carapace a little less than one-third of total length of animal, longer than pedigerous somites together and a little wider than deep; as in the female the antero-lateral angle lacks the acute tooth present in both sexes of *waitiei*. Ocular lobe very wide, with the three corneal areas large and distinct.

Pleon distinctly shorter than cephalothorax; fifth somite not much longer than fourth but longer than any of the others and more than half as long again as fifth; apical spines of telson about half as long as the somite.

Antennae as in male of *waitiei*.

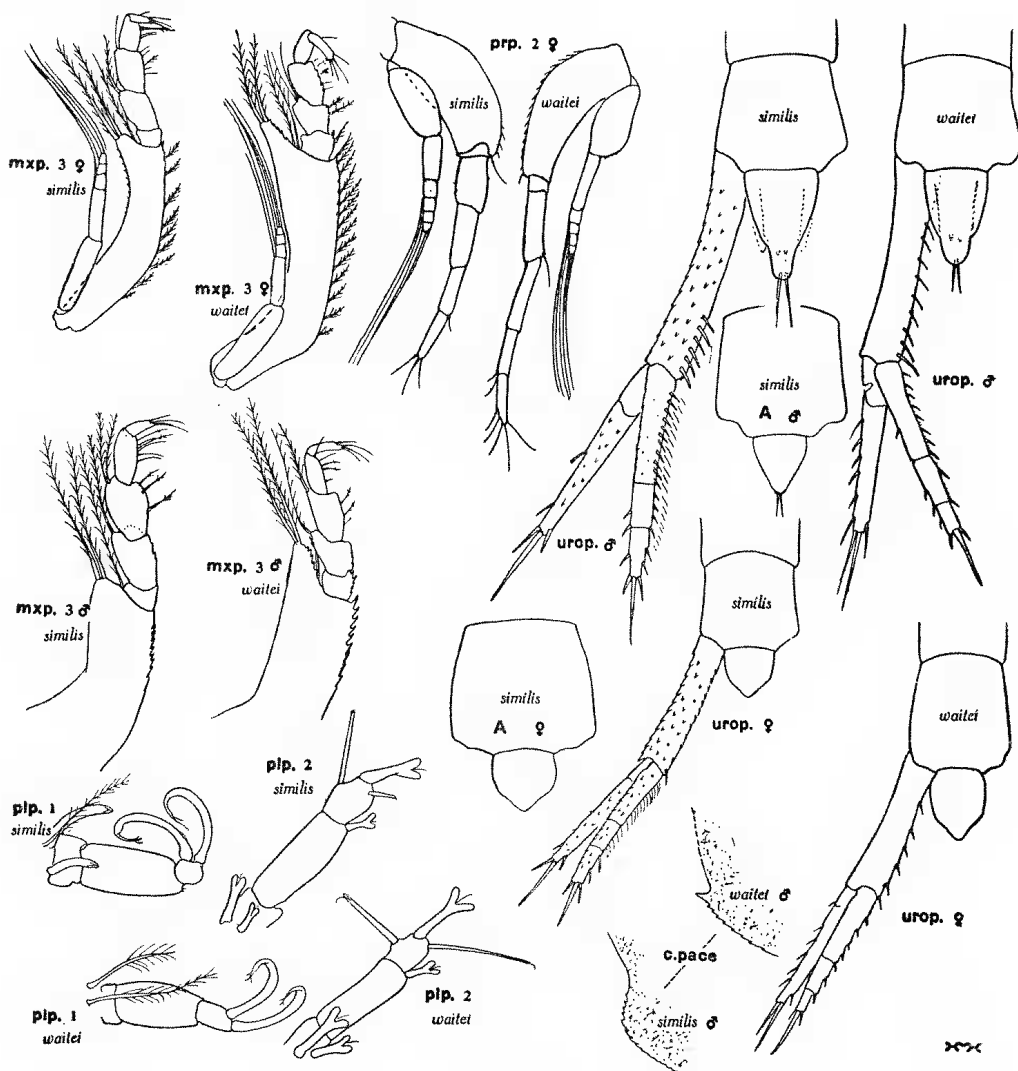


Fig. 24

*Anchistylis similis*, appendages of paratypes adult male and ovigerous females with those of *A. waitiei* for comparison; c. pace, antennal angle (x 55); mxp. and prp., third maxilliped and second peraeopod (x 55); plp., pleopods (x 120); urop., uropod with sixth pleon somite and telson (x 55). A, Sixth pleon somite and telson of *A. similis*, male and female, from Tasmania (x 55).

Third maxilliped with basis nearly twice as long as rest of limb, with external distal angle much less produced than in *waitiei* (cf. mxp. 3 of males in fig. 24). Basis of first peraeopod a little longer than remaining joints together, that of second not quite as long as rest of limb.

Second and third legs not widely separated as in female.

Peduncle of uropod a little longer than rami, with inner spines near distal end; joints of endopod of same proportions as in female.

Length, 4 mm.

*Loc.*—New South Wales: Cronulla, 8 feet, on sand (type loc., K. Sheard, submarine light, Sept. 1942). Tasmania: St. Helens Point, 4-5 fms., on clean sand (W. S. Fairbridge, submarine light, Jan. 1945). South Australia: St. Vincent Gulf, off Glenelg (H. M. Cooper, submarine light, Nov. 1944). Types in S. Aust. Museum, Reg. No. C.2730-2731.

The telson of some examples (Tasmania) is relatively smaller than in others (fig. 24, A), and there is some variation in the total length of the animal.

The pleopods of a few of the males of *waitei* and *similis* from different localities have been critically examined. There is some slight variation in the setae of the body, and in *similis* the lower (or anterior) seta of the ramus of the second pleopod seems always to be shorter than in *waitei*, or may even be absent.

Males usually predominate in the available takings of both *waitei* and *similis*, but in a submarine light haul in Tasmania Mr. Fairbridge secured a large number of females together with some males. Many of the females are 4 mm. to 4.5 mm. in length and have just moulted; the brood-pouch is fully developed but empty and the ovaries are swollen with large eggs (see also *Cyclaspis usitata* Hale, 1944, 124, and *Glyphocuma bakeri* Hale, 1944 a, 273).

In both *waitei* and *similis*, some examples in soft condition have the carapace curiously inflated and expanded; this is probably due to the effect of the preservative.

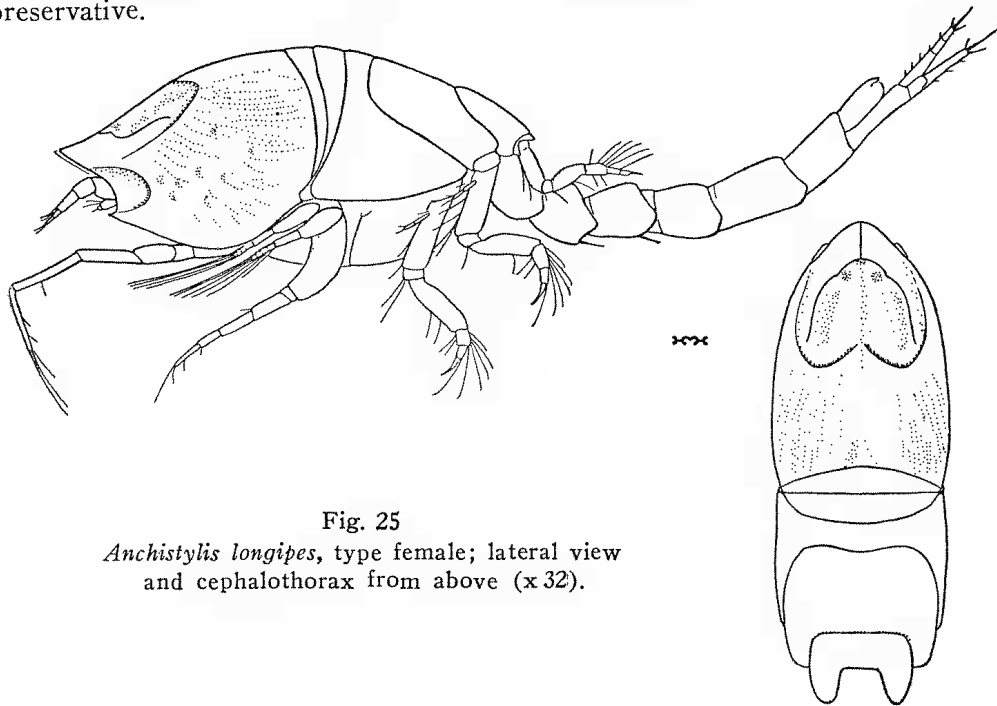


Fig. 25  
*Anchistylis longipes*, type female; lateral view  
and cephalothorax from above (x 32).

***Anchistylis longipes* sp. nov.**

*Female with developing marsupium*—Carapace two-sevenths of total length of animal and a little longer than pedigerous somites together; its depth is about three-fourths the length and is equal to the breadth; carinae, etc., much as in genotype; the curved, anterior, dorso-lateral ridge on each side is serrate



posteriorly but the teeth die away towards the front and the ridge itself becomes very faint near that which marks off the antennal area. Antero-lateral margin shallowly concave, finely dentate, and antennal angle produced as acute tooth. Pseudorostrum rounded as seen from above, subacute in front as viewed from the side; lobes meeting for a distance equal to one-sixth of total length of carapace. Ocular lobe wide, with three ill-defined, whitish lenses.

First and second pedigerous somites, as in the other species, shorter than the others; pleural parts of first concealed by those of second, which extend to the carapace; third somite short dorsally but greatly expanded fore and aft on

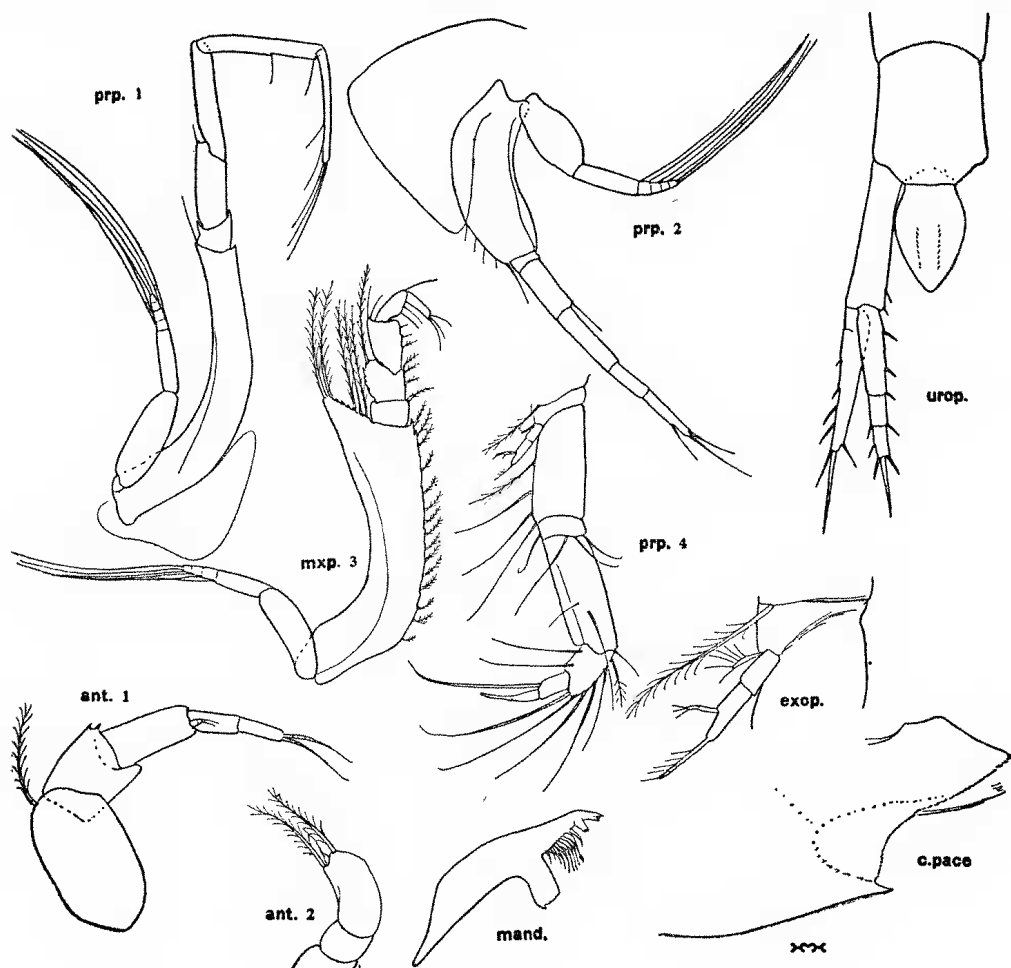


Fig. 26

*Anchistylis longipes*, type female; c. pace, antero-lateral margin of carapace and antennal angle (x 55); ant., first and second antennae (x 120); mand., mandible (x 55); mxp. and prp., third maxilliped, and first, second and fourth pereopods (x 55); exop., exopod of fourth pereopod (x 120); urop., uropod with sixth pleon somite and telson (x 55).

the sides, where it reaches almost to anterior margin of second; anterior edge of fifth somite finely denticulate on back.

Pleon a little shorter than cephalothorax; fifth somite little longer than sixth which is longer than wide; telson large, elongate, cordate, without post-anal part, about three-fourths as long as either sixth somite or peduncle of uropod.

First antenna stout, the first joint of peduncle as long as second and third together; flagellum as long as last peduncular joint, composed of two stout equal joints; accessory lash minute, two-jointed.

Mandible with 10 and 11 spines in the row.

Third maxilliped with basis more as in *waitei* than in *similis*; it is more than half as long again as rest of limb and the external distal part is expanded and produced forwards to level of apex of ischium; exopod much shorter than basis.

First peraeopod with carpus reaching well beyond antennal angle and propodus beyond tip of pseudorostrum; basis only two-thirds as long as remaining joints together; carpus, propodus and dactylus are about equal in length, each as long as ischium and merus together.

Second peraeopod with basis as long as rest of limb without dactylus; carpus almost as long as merus and the distinct ischium together, three-fourths as long again as propodus and a little longer than dactylus.

As in the other species the first and second peraeopods have well-developed exopods, the third and fourth with small two-jointed exopods, with indication of the division of the second segment into two parts (fig. 26, exop.).

Peduncle of uropod about as long as the subequal rami, with a couple of distal spines on inner margin; endopod with first segment three times as long as second which is equal in length to third; inner spines of joints three, one and one; terminal spine of endopod shorter than that of exopod and no longer than last two joints of its ramus.

Length, 3.2 mm.

*Loc.*—South Australia: Spencer Gulf, Memory Cove, 3 fms. (K. Sheard, submarine light, Feb. 1941). Type in S. Aust. Museum, Reg. No. C.2737.

#### SUMMARY

The majority of the Australian Diastylids so far obtained are referable to *Gynodiastylis* Calman and allied genera. Of the others, herein dealt with, all but two species belong to *Paradiastylis* Calman, *Dimorphostylis* Zimmer and *Anchistylis* gen nov., in which the males have the basis of the first to fourth peraeopods conspicuously expanded. The new genus is noteworthy in that it has the pleopods remarkably modified.

Species regarded as new are *Leptostylis recalvastra*, *Paradiastylis mollis*, *Dimorphostylis subaculeata* and var. *praecox*, *D. inauspicata*, *D. tasmanica*. *D. colefaxi*, *D. tribulis*, *Anchistylis similis* and *A. longipes*.

Notes are given concerning the female of *Dimorphostylis cottoni* Hale and the male of *D. vieta* (Hale), neither of which was previously described in detail, and the description of the male of *D. australis* Foxon is amplified.

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